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ABSTRACT

Concern for quality vocational education programs and a decision-making system for curriculum development and evaluation led to the implementation of this four-phase project. The initial phase of the project involved: (1) a review of literature related to the development and application of process models to curriculum development and evolution, (2) the identification of consultants and resource agencies to be utilized in initial model development, and (3) future project planning in relation to project objectives, the involvement of state and local personnel, project testing and evaluation, dissemination, and budgeting. Curriculum models reviewed by the investigators included the objectives model, the product development model, the accreditation model, and the management-system model. One of the major recommendations of this initial phase called for a further investigation of the literature with respect to management systems in order to identify and compare their rationale, components, and elements. Also included in the report are the Project Proposal--Phase I, Consultants and Agencies Identified during Phase I, and Personnel Qualifications. (Author/JS)

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PHASE I REPORT OF
A RESEARCH AND DEVELOPMENT PROJECT
IN OCCUPATIONAL EDUCATION:

THE DEVELOPMENT OF PROCESS MODELS FOR DECISION-MAKING IN CURRICULUM DEVELOPMENT AND EVALUATION

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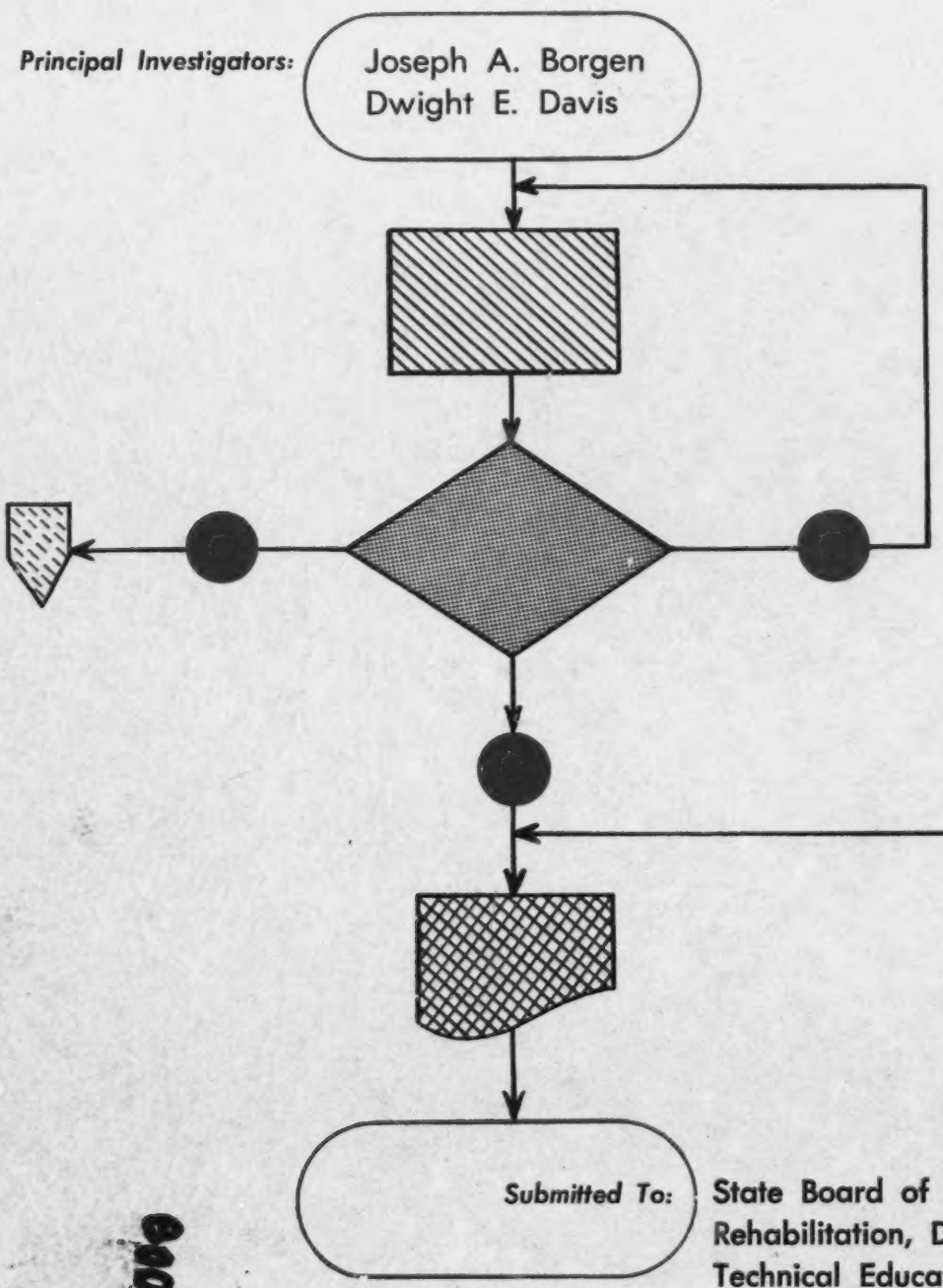
Dwight E. Davis



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Submitted To: State Board of Vocational Education and Rehabilitation, Division of Vocational and Technical Education, Research and Development Unit
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Final Report of Phase I

A RESEARCH AND DEVELOPMENT PROJECT IN OCCUPATIONAL EDUCATION: THE DEVELOPMENT OF PROCESS MODELS FOR DECISION-MAKING IN CURRICULUM DEVELOPMENT AND EVALUATION

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Joseph Borgen

Dwight Davis

FOREWORD

In recent years, there have been many expressions, verbal and written, that point to the need for organized state and local planning for the development of quality occupational programs. This emphasis on the need for better planning is reflected in the Illinois State Plan for Vocational Education. The new directions charted by this plan stress the need for a more defensible approach to curriculum development and evaluation. These new directions require conserted planning both on the state and local levels to adequately implement the intent of the legislation in the form of a quality comprehensive statewide program of vocational education.

This concern for quality programs and a decision-making system for curriculum development and evaluation prompted the proposal for "A Research and Development Project in Occupational Education: The Development of Process Models for Decision-Making in Curriculum Development and Evaluation." (See Appendix I for Phase I proposal.)

This document has been assembled to report on the investigative activities executed during Phase I and the potential of the project for Phase II. David A. Anderson and Urban T. Oen have been hired as Project Coordinator and Research Coordinator respectively to implement Phase II. Both have assisted with the preparation of this final report. (See Appendix III for personnel qualifications.)

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INTRODUCTION

Phase I of the "Research and Development Project in Occupational Education: The Development of Process Models for Decision-Making in Curriculum Development and Evaluation" (herein referred to as "the project") was initiated March 1, 1970, with a grant of $24,550.00 from the State of Illinois, State Board of Vocational Education and Rehabilitation, Division of Vocational and Technical Education, Research and Development Unit. This grant, combined with $6,916.00 in local funds, provided a total budget of $31,466.00 to conduct the project through June 30, 1970. Due to the difficulty of obtaining staff to work for the short duration of Phase I, $10,740.00 of state funds and $4,196.00 of local funds, a total of $14,936.00, was actually spent of the total grant.

The project is separated into four phases to deal with the following general questions:

1. Can generalizable process models be developed to provide curriculum planners with a systematic decision-making procedure for program identification, development, implementation, execution, and evaluation?
2. Is it possible to develop guidelines for the identification and utilization of resources and evaluative criteria in accomplishing the activities specified in the models?

Phase I of this four phase project was executed as a project-planning period giving attention to the following:

1. Review of literature related to the development and application of process models to curriculum development and evaluation;
2. The identification of consultants and resource agencies to be utilized in initial model development; and
3. Future project planning, giving consideration to:
   a. project objectives
   b. the involvement of state and local personnel
   c. project testing and evaluation
   d. dissemination
   e. budget

SUMMARY OF FINDINGS

Three major areas of concern were identified in the literature as being particularly important to establish a firm basis for the project: 1) Models for Curriculum Development; 2) Models for Curriculum Evaluation; and 3) the Social and Economic Effects of a Planned Curriculum on a nation.

Models for Curriculum Development

The project consultants identified three basic approaches to curriculum development which they felt had merit: 1) the objectives approach; 2) the product development approach; and 3) the systems approach.

The objectives approach is primarily oriented toward decisions to be made in curriculum development. The consultants reviewed the Taba Approach because they considered it representative of the objectives models. Taba (62) identified five major decisions to be made in curriculum development:

1. What are the aims of the school and the objectives of instruction?
2. What areas or subjects are to be selected and what content is to be covered in each?

3. What types of learning experiences are to be utilized in the curriculum?
4. How is the curriculum to be evaluated?
5. What is to be the overall pattern of the curriculum?

The consultants concluded that this approach is of a low level of specificity and is quite general in nature; however, they felt the approach could have application in the project.

The product development approach focuses on the development of an empirically validated curriculum and assumes that: 1) the process of developing a validated curriculum is feasible; 2) the development program is marked by a cyclic process of redefinition; and 3) a high degree of technical competence, facilities, and organization will be available to the development agency. The consultants concluded that: 1) many substantive illustrations of this approach are widely available; 2) the approach is most appropriate for use by a well-coordinated and highly trained staff as the development of a curriculum under this procedure is an exhausting and resource-draining enterprise; and 3) the approach is of a high level of specificity.

The systems approach can be classified as being a way of thinking that represents an extension of the scientific attitude and method to the handling of administrative problem-solving. It encourages the expansion of analytical activity and attempts to utilize cross-disciplinary methods. The focus is on the total problem and all relevant parts as well as on the environmental context against which

the problem appears. The consultants identified three major phases to the systems approach:

1. Systems analysis is undertaken for the purpose of identifying rational decisions concerning the design, selection, and operation of a system.
2. Systems engineering provides for the dividing of the overall tasks into subtasks. Assignments are made to various groups so that each can operate in a well-defined sphere and where interaction among groups is clear-cut and minimal.
3. Systems management is usually organized along departmental hierarchies and provides for the flow of information and authorization vertically within each hierarchy.

The consultants concluded that a systems approach to management: 1) cannot readily be introduced piece-meal into an organization; and 2) would be difficult to use for the development of the curriculum while other aspects of college management follow conventional line and staff relationships.

Models for Curriculum Evaluation

The project consultants found that there were four basic models of curriculum evaluation: 1) accreditation; 2) Tylerian; 3) management-systems; and 4) summative-composite.

The accreditation model relies on arbitrarily arrived-at standards for judging a program and was felt to be inappropriate by the consultants.

The Tylerian model focuses mainly on measuring the attainment of objectives with little emphasis on inputs and processes and it also was felt to be inappropriate by the consultants.

The management-systems model is primarily oriented toward decision-making. An example model reviewed by the consultants was the Stufflebeam Model (56). Stufflebeam identified four kinds of evaluation: 1) context; 2) input; 3) process; and 4) product. The consultants believe the model is rather complex as it involves many kinds of data and attempts to establish a system for coordinating evaluation efforts.

The summative-composite model is similar to the management-systems model except that it does not attempt to specify the coordination of evaluation across levels. Instead, it emphasizes gathering standards and judgments. An example model reviewed by the consultants is the Stake Model (51). Standards are used to compare intents and the observations and judgments are made on the basis of the standards.

The consultants found it difficult to distinguish between development and evaluation. After investigating development and evaluation designs, they found that development and evaluation are different functions; but, to be effective, they must be highly integrated with each other. The consultants suggested the following:

1. The evaluation plan should use the feedback loop idea so that there is coordination between the evaluation at the course and learning experience level as well as the program level.

2. The evaluation plan should provide for a description of context.
3. When a decision is made about a program, the intents of the program should be specified in terms of antecedents (inputs), transactions (processes), and outcomes (products).

The consultants had a favorable outlook toward the proposed scope of the curriculum model proposed by the investigators.

Economic Implications of a Planned Curriculum

In reviewing economic implications, the consultants found that educational planning stems mainly from two areas of economic thought: 1) manpower forecasting; and 2) decision-making covering capital investment allocations (cost benefit).

The consultants found that the human factor (residual), which is sometimes called the organizational factor, is starting to be considered by industry in determining the rate of productivity increase. They also found that it may be difficult to establish parameters of the relationship of vocational or general education to GNP.

Consultants and Agencies Identified

A listing of consultants and resource agencies useful in subsequent phases of the project was identified during Phase I. Each was surveyed to ascertain competency, availability, and consultant fees charged (See Appendix II).

RECOMMENDATIONS

As a result of the Phase I investigative activities, the investigators and consultants have identified the following as having implications for further project development:

1. Definitions of terms are needed that are consistent with those found in the literature.
2. Additional review of literature must be conducted to further compare and analyze models of curriculum development and evaluation.
3. The literature must be further investigated with respect to management systems to identify and compare their rationale, components, and elements.
4. A study of present practices and exemplary processes in curriculum development and evaluation in occupational education must be conducted to identify the commonality of procedures, opinions, and judgments among curriculum planners relative to adequacy and to provide a basis for a comparison of procedures being implemented.
5. An analysis of decision-making systems, models for curriculum development and evaluation, and data gathered on present practices should be analyzed to provide a basis for initial model development related to the project goals.
6. Further attention should be given to the task of defining the relationship between a planned curriculum and the social

and economic growth of a nation, as such information may be important to the project.

7. The preparation of a dissemination plan should be undertaken at such time as funding for Phase II has been secured and specific direction for Phase II investigative activities has been determined.

8. Any plan for resource acquisition should receive further study as a part of the initial planning for Phase II.

9. Plans should be made to obtain the services of an outside evaluating agency to conduct a project evaluation. Said services should be obtained on a consultative basis and should be planned for as a part of the consultant fee budget item in the Phase II proposal.

10. The PERT system of management should be adopted for Phase II of the project.

INVESTIGATIVE ACTIVITIES -- PHASE I

The following report is an in-depth analysis of the investigative activities conducted during Phase I. Also included is an outline of activities to be executed during Phase II.

Investigative activities for Phase I were stated in task form with a task designated to each of the following major concerns:

1. What management strategy should be adopted for the project?
2. What consultants and resource agencies would be helpful in achieving the objectives of the project?
3. What approaches can be abstracted from the literature with respect to curriculum design and evaluation and how might these approaches be categorized?
4. What relationship exists between a planned curriculum and the social and economic growth of a nation?
5. Can a design be prepared to gather data on existing methods of program identification, development, execution and evaluation in selected institutions offering occupational programs in the State of Illinois?
6. What plans should be adopted for resource acquisition, storage, and retrieval?
7. To what extent should an outside agency be used in evaluating the project?

8. What information and to whom should information be disseminated during Phase I and Phase II of the project?

An Investigation of Models for Curriculum Development and Evaluation

MODELS FOR CURRICULUM DEVELOPMENT

The investigation of models for curriculum development and evaluation was guided by the following task statements:

1. To prepare a report on approaches of curriculum design which are not process models.
2. To report on two or more process models which may be used in curriculum design.

Early in the investigation, it became apparent that the distinction drawn in the task specifications between process and non-process models was not a viable one. In reporting, the investigators concluded that all curriculum models are process models in the sense that the development of any curriculum is a process (47:4).

Proceeding with the investigation of "curriculum models," and not attempting to distinguish between process and non-process models, the investigators rapidly learned from the literature that the concept of a model, i.e. what it is and what it is supposed to do, has little real utility, except as a piece of appropriate jargon (47:2).

Project consultants, Sjogren and others, stated: "Certainly, if the discussions of models and their characteristics that have come to us

from Kaplan (29), Broadbeck (12), and Chin (16) are taken as representative, it is hard to avoid the conclusion that there are, presently, few, if any, actual models of curriculum development. This may in part reflect the equally obscure role that has traditionally been held by theories of curriculum" (47:2).

Project consultants (47:1-2) felt reluctant to compare models because, in their opinion, each of the following variables plays a part in determining the overall advantage or disadvantage of a model:

1. How ready is the institution for change?
2. What expertise can be expected to play a role in the development process?
3. What is the nature of the desired change?
4. Where are the pressures for change originating?
5. Who will initiate the change in curriculum? How will the new curriculum be institutionalized?

Although no specific comparison across models was made, the consideration of each development process was guided by a set of questions developed by the project consultants, Sjogren and others (47:2-3). These questions, as presented here, were used as analytic guides in the consideration and presentation of each model.

1. Who authored the model, and what has been the extent of its documentation?
2. What assumptions underlie the model, and are they enumerated in a rationale?
3. What are the major components and/or phases of the model?

4. Does the model provide substantive illustrations or are they available elsewhere?
5. Does the model contain components that would qualify it for one type of development activity rather than another?
6. At what levels of specificity* does the model function?

As a result of their review of the literature, project consultants (47:6-31) identified three basic approaches to curriculum development: the objectives approach, the product development approach, and the systems approach. Each is described on the following pages in response to the previous six numbers.

Objectives Model of Curriculum Development

1. The objectives model of curriculum development is thought to have originated with the work of Ralph Tyler (65). This general model has gained widespread acceptance. One clear delineation of the objectives model has been offered by Taba (62). Taba's statement will be considered representative of objectives models.
2. The rationale for the objectives model of curriculum development has been discussed in great detail by Tyler, Taba, and others. Taba (62) identifies five major decisions to be made in curriculum development. These decisions reflect primary areas of concern for the developer.
   a. What are the aims of the school and the objectives of instruction? The objectives model assumes the primacy of

*Levels of Specificity: Low (A) -- Model is basically composed of broad verbal and graphic outlines and/or definitions of its major components and phases; Middle (B) -- In addition to A, the model contains descriptions or explanations of the relationships between the several continuum on which it must be constructed; High (C) -- In addition to A and B, the model provides detailed sub-classifications of tasks or subsystems and indications of parameter locations. (47:3)

objectives in the development process.

b. What areas or subjects are to be selected? What specific content is to be covered in each?

c. What types of learning experiences are to be utilized in the curriculum?

d. How is the curriculum to be evaluated?

e. What is to be the overall pattern of the curriculum?

The curriculum developer, then, must consider each of these questions as he seeks to create a curriculum. At each point, decisions among possible alternatives must be made. Taba (62) suggests three general questions, the answers to which provide criteria by which the developer makes decisions. These general questions suggest the rationale which guides the conception of the objectives model of curriculum development.

1. What are the demands, and the requirements, of the culture in which the curriculum will operate?

2. What do we know about the learning process and the nature of the learner?

3. What is the nature of knowledge? What are the characteristics and contributions of the disciplines?

In general, the rationale for the objectives model suggests that curricula originate from the demands and requirements of the society, that the curricula ought to be firmly grounded in our knowledge of the learner and the learning process, and that the curricula ought to reflect an understanding of the nature of knowledge. Further, the objectives of the curriculum must be clearly delineated, and a

means of evaluating the effectiveness of the curriculum in meeting the objectives must be defined as a part of the development process.

3. Taba (62) suggested seven basic steps in the curriculum development process:

   a. Diagnosis of needs. The curriculum developer must assess the needs of the society.

   b. Formulation of objectives. From the needs assessment, the developer formulates objectives for his curriculum. The objectives reflect the intent of the curriculum to meet identified needs. [There is a considerable amount of discussion as to how objectives are to be stated. The primary concern is whether objectives must be stated in behavioral terms. For a discussion of various viewpoints on this issue, see Atkin (5), Popham, et al. (39).]

   c. Selection of content. In most instances, curriculum developers must select representative content from a larger universe of possible content. The selection of content is closely associated with the needs and objectives identified previously.

   d. Organization of content. Once content is selected, it must be organized in some manner. Questions of scope, sequence, etc., must be attended to at this step.

   e. Selection of learning experiences. From the variety of learning experiences potentially available, the curriculum developer must select those that seem most appropriate to the objectives and the content selected for inclusion in the curriculum.

   f. Organization of learning experiences. As with content, learning experiences must be organized in some fashion.

g. Determination of what and how to evaluate. As a part of the development process, the developer determines what he will evaluate and how he will carry out that evaluation. A later section of this report deals with two evaluation procedures.

4. Perhaps the most detailed illustration of the objectives model of curriculum development is found in Taba's (62) work. The model has been used extensively.

5. This (objectives model) is one of the most general models proposed. The stages in its development are generalizable to a wide variety of instances.

6. The objectives model has a low level of specificity which means it is quite general. There are, however, many explicit applications and discussions of the model.

A review of the literature reveals a vast number of sources that are relevant to the objectives model of curriculum development. In the literature, the Tyler entry (65), together with the Taba entry (62), constitute two of the most important statements about the objectives model. The Douglass entry (19) is merely representative of many such works.

Product Development Model of Curriculum Development

1. The authorship of this pervasive development format is not attributable to a single individual or group. Its origins and principal proponents are in the operant psychology of B. F. Skinner (48), the programmed instruction movement (34), and the works of Tyler (64), Popham and Husek (40), Mager (33), and Baker (8).

2. This approach has traditionally assumed that:

   a. empirically validated curriculum should be developed and that this process is feasible;

   b. the development program must be marked by a cyclic process of redefinition; and

   c. a high degree of technical competence, facilities, and organization will characterize or be available to the development agency.

3. The major components or phases of this model include the following:

   a. Formulation

      1) Description of general intents. Completion of a program rationale.

      2) Exploration of various sources of program goals. Sources include:

         a) the society and community

         b) the institution

         c) the teacher and learner

      3) Justification of product. Search for existing materials and procedures that have proven effective.

      4) External review of procedures and findings (to be repeated throughout the development process).

   b. Specification

      1) Develop tentative, detailed specifications of project outcomes in terms of performance and statements of post-instructional behaviors for both student and teacher.

      2) Analysis and subdivision of more complex program objectives into prerequisite and component skills.

3) Design criterion referenced items to measure objectives. Develop examinations containing measures of sub- and terminal objectives and field test to determine appropriate item format for target population.

4) Compose tentative list of expected entering behaviors.

5) Conduct a complete external review.

c. Development

1) Describe and produce alternative modes for presenting instruction. Criteria for mode selection include:

a) replicability

b) cost

c) feasibility

2) Testing of sample instructional segments.

3) Selection of segments to be included.

4) Statement of criteria for selection of learning experiences. Criteria could include:

a) presence of practice

b) presence of appropriate cues

c) provision for knowledge of results

5) Testing of longer sequences of materials on appropriate groups (individuals, small, large, etc.).

d. Field Testing: Purposes

1) To determine the appropriateness of procedures in real classrooms.

2) To collect teacher observations.

3) To collect data on change in student behaviors or competencies.

4) To experimentally compare alternative modes of presentation.

e. Revision Cycles

1) Organization of all sources of data:

a) observer records

b) user reports and preferences

c) pupil performance

d) results of controlled variation studies

2) Repeat revision and field testing. Utilization of a cost-effectiveness criterion.

f. Implementation

1) Broad scale introduction to regular classroom use.

2) Summative evaluation.

4. Substantive illustrations of this development process are widely available. They represent the process in whole or part. The citations at the end of this section present explicit delineations of the process or its parts.

5. This model is most appropriate for use by a well-coordinated, highly trained network of product development expertise. As Baker (6:17-18) has suggested: ". . . the systematic development of curricula according to the described pattern (product development model) is an exhausting and resource-draining enterprise. Some university-developed curricula have been heavily data-based, but even in eras of liberal federal funding, the careful management of trained development personnel has usually not characterized such ventures."

6. This model is available with a high degree of specificity.

Systems Analysis and Curriculum Development

There has been increased attention given to systems analysis for possible application to curriculum development. In this section, three systems

models are presented. Each model assumes, for the most part, that the developmental process is linear.

A systems approach to management cannot readily be introduced piecemeal into an organization. As will be shown, it would be difficult to use a systems approach for the development of the curriculum while other aspects of college management followed conventional line and staff relationships. Most relevant to the practitioner in educational administration is simply the systems perspective. It is a way of thinking about management problems.

Systems thinking will force the administrator to look at the totality of situations or problems, to take a long range view regarding his organization, to analyze consciously antecedent conditions and possible effects, to utilize cost-utility approaches to choice, and to optimize for the total organization. The predictive power of the educational manager will be enhanced through a more skillful approach and an improved ability to deal with uncertainty. Generally, the many heuristic vehicles, procedures, models, and tools employed by the systems approach can contribute to the facilitation of administrative practice. The approach must be considered as a <u>facilitator</u> of the management process and not as a panacea.

The systems approach can be classified as being a way of thinking that represents an extension of the scientific attitude and method to the handling of administrative problem-solving. It encourages, even demands, the expansion of analytical activity, and attempts to utilize cross-disciplinary methods. It is holistic, rather than atomistic, and con-

textual: the focus is on the total problem and all relevant parts as well as on the environmental context against which the problem appears.

There are three major phases to the systems approach. These phases, while they appear separate in exposition, are thoroughly intertwined and integrated in practice.

1. Systems Analysis. Systems analysis is undertaken for the purpose of identifying rational decisions concerning the design, selection, and operation of a system. The main goal is the identification of the one best system (and subsystems) and the most efficient way of operating it. Here, a clear distinction must be made between the process and the structure of systems analysis. Process is parent to the structure. The analysis then sets the grand design pattern for the organization and in connection with the problems which will be processed.

2. Systems Engineering. Where a task is extensive and complex, there might be too many goals for a single group to manage properly. The task must be subdivided and assigned to several groups. Systems engineering divides the overall task into subtasks. Assignments are then made to various groups so that each can operate in a well-defined sphere and where interaction among groups is clear-cut and minimal. A measure of the effectiveness of systems engineering is when the total task has been completed and the work of groups can be readily integrated into an overall working system. For example, a radio receiver is an operational system consisting of several

subsystems -- detector, rf, if, and af stages. Each subsystem has unique specifications and each must integrate with the other and contribute to the operation of the radio.

3. Systems Management. Frequently, management is organized along departmental hierarchies. Information and authorization flows vertically within each hierarchy. Lateral flow between hierarchies, however, occurs only at the top. When sophisticated and complex activities which involve several departments of an organization are undertaken, the efforts of each department must be coordinated with the other. Management must transcend departmental boundaries. An important attribute of the systems approach is organizational control exercised by the systems manager. His responsibility cuts across functional and boundary lines. Here authority and responsibility exist to implement the findings of systems analysis.

The systems approach to management has several advantages. It has provided an avenue for functional analysis in terms of antecedent conditions and developmental trends. Phenomena are assessed in context, spatially and chronologically. It has provided an approach to structural analysis in terms of connections and relationships. Structures are not, therefore, abstracted or superimposed, but are analyzed through empirical referents. The approach is operational. A system problem is not mechanical, or psychological, or sociological; rather these are ways of looking at the problem. Problem-solving becomes a matter of looking at the system and the forces affecting it, and then asking and finding the answers to the right questions. The systems perspective is futuristic:

i.e., one that projects developmentally long range plans. Systems thinking is a realistic way of manipulating variables in a complex context. End results are viewed in terms of relevant conditions and ultimate pay-offs. It has provided a unifying force for practice and inquiry and spans a number of disciplines. In this sense, it has resulted in a cross-disciplinary approach that has yielded a heuristic perspective on reality.

Disadvantages incident to the use of the systems approach are related to the size of the using organization. Most administrative personnel have been trained in operational activities and not in the use of systems management. The main ingredients of the systems approach to management are long-term planning and research data and the technology for employing the ingredients. Thus, in order to introduce the systems approach, new personnel would have to be employed. A key person in the support staff is the systems analyst who would be responsible for the operation of the entire system and its subsystems.

Three different systems models are presented below by source, documentation, assumptions, and major features.

Systems Model Number 1

1. Walter M. Arnold, Vocational, Technical, and Continuing Education in Pennsylvania: A Systems Approach to State-Local Program Planning. Pennsylvania Department of Public Education, 1969.

   The project was undertaken as an effort to systematize state-wide educational planning; thus, it has not been released for publication and has received no documentation.

2. Several assumptions appear:

   a. There is a relationship between socio-economic planning and vocational education program planning.

   b. State-level planning can be integrated with that of local school district planning.

   c. The planning sequence is linear.

3. Major planning steps and plan development levels are:

Planning Steps	Plan Development Levels
a. Problem Defining	a. Socio-Economic Planning
1) objectives	b. Vocational Education Program Planning
2) constraints	c. Vocational Education Resources Planning
3) translation	
b. Problem Solving	
1) analysis	
2) trade-offs	
3) synthesis	

   (See Figure I)

4. While the model does not include substantive illustrations, ample data can be found in the literature related to Planning, Programming, Budgeting Systems (PPBS).

5. The model design appears to be an adaptation of the PPBS approach and modified for use in an educational system. This particular design, however, seems to be geared for use at a state-level operation.

6. The model is of a middle level of specificity.

(See Figure I)

Figure I

PROCEDURE FOR VOCATIONAL EDUCATION PROGRAM PLANNING

(PROBLEM DEFINING) ↑ (PROBLEM SOLVING) ↓

(PLAN DEVELOPMENT LEVELS) →

PLANNING CYCLE STEPS	(1) SOCIO-ECONOMIC PLANNING	(2) VOC. ED. PROGRAM PLANNING	(3) VOC. ED. RESOURCES PLANNING
OBJECTIVES GENERAL STATEMENT OF THE PROBLEM	(1.1) DETERMINE THE SOCIO-ECONOMIC NEEDS AND PLANS OF A LOCAL AREA WHICH AFFECT THE PLANNING OF A VOCATIONAL AND TECHNICAL EDUCATION PROGRAM.	(2.1) DEFINE A VOCATIONAL AND TECHNICAL EDUCATION PROGRAM IN TERMS OF OCCUPATIONAL FIELDS AND COURSES WHICH WILL IMPROVE THE LOCAL SOCIO-ECONOMIC SITUATION.	(3.1) DETERMINE THE RESOURCE REQUIREMENTS AND THE COSTS TO IMPLEMENT THE VOCATIONAL AND TECHNICAL EDUCATION PROGRAM.
CONSTRAINTS THE EXISTING CONDITIONS AND ENVIRONMENT OF THE PROBLEM	(1.2) IDENTIFICATION OF EXISTING SOCIO-ECONOMIC CONDITIONS WHICH INFLUENCE THE PLANNING OF A VOC. ED. PROGRAM: • SOCIO-ECONOMIC NEEDS. • INDUSTRY NEEDS SURVEYS. • SPECIAL SOCIO-ECONOMIC PROBLEMS.	(2.2) IDENTIFICATION OF EXISTING AND PRESENTLY PLANNED PROGRAMS (AS DEFINED BY COURSES OF OCCUPATIONAL INSTRUCTION). SURVEYS OF THE SUPPLY OF STUDENTS AND THEIR OCCUPATIONAL PREFERENCES.	(3.2) IDENTIFICATION OF EXISTING AND PRESENTLY PLANNED -- • PROGRAMS (AS DEFINED BY COURSE/RESOURCE COMBINATIONS). • FACILITIES AND MAJOR EQUIPMENT. FINANCIAL AND RESOURCE PROCUREMENT LIMITATIONS.
TRANSLATION PROBLEM SET-UP: 1. INTERPRETATIONS AND PROJECTIONS OF CONSTRAINTS. 2. MEASURABLE GOALS BASED ON THE OBJECTIVES.	(1.3) THE SOCIO-ECONOMIC PROBLEM: • INTERPRETATION OF THE SOCIO-ECONOMIC INFORMATION. • PROJECTIONS OF THE SOCIO-ECONOMIC INFORMATION AND INTERPRETATIONS INTO THE FUTURE. • MEASURABLE (LOCAL AREA) SOCIO-ECONOMIC GOALS.	(2.3) THE VOC. ED. PLANNING PROBLEM: • THE TRANSLATION OF INDUSTRY EMPLOYMENT NEEDS (GROWTH AND REPLACEMENT) INTO OCCUPATIONAL TRAINING NEEDS. • MEASURABLE (LOCAL AREA) VOC. ED. PROGRAM GOALS.	(3.3) PLANNING PROBLEM (CONTINUED): • THE TRANSLATION OF COURSE REQUIREMENTS INTO RESOURCE REQUIREMENTS. • PROJECTIONS OF THE FOLLOWING INTO THE FUTURE: • RESOURCE UNIT COSTS • TECHNOLOGICAL DEVELOPMENTS
ANALYSIS 1. IDENTIFICATION OF SYSTEM ELEMENTS. 2. DETERMINATION OF THE RELATIONSHIPS BETWEEN THE ELEMENTS. 3. DETAILED REQUIREMENTS. 4. CANDIDATE APPROACHES.	(1.4) STEPS: SEE CHART 3 • CONSTRUCT A LIST OF POTENTIAL NEW INDUSTRIES. • OBTAIN DATA RELATIVE TO CRITERIA, WHICH CAN BE USED TO RATE THE ATTRACTIVENESS OF POTENTIAL NEW INDUSTRIES TO A TYPICAL COMMUNITY.	(2.4) STEPS: SEE CHART 3 • DETERMINE THE ANNUAL EMPLOYMENT NEEDS OF POTENTIAL NEW INDUSTRIES. • DETERMINE THE ANNUAL NEEDS OF EXISTING INDUSTRIES. • DETERMINE TOTAL OCCUPATIONAL TRAINING NEEDS. • SHORTAGES AND SURPLUSES.	(3.4) STEPS: SEE CHART 3 • DETERMINE THE RESOURCE REQUIREMENTS PER COURSE. • DETERMINE THE OPERATING AND CAPITAL COSTS FOR EACH COURSE. • DETERMINE ALTERNATIVE PROGRAMS (COURSE/RESOURCE COMBINATIONS).
TRADE-OFFS 1. DETERMINE SELECTION CRITERIA. 2. DETERMINE RATING OF EACH CANDIDATE APPROACH USING EACH CRITERIA. 3. SUMMARIZE RATINGS AND MAKE SELECTIONS.	(1.5) DETERMINE RATINGS OF POTENTIAL NEW INDUSTRIES USING TWO CATEGORIES OF CRITERIA AS FOLLOWS: • ATTRACTIVENESS OF THE INDUSTRIES TO THE COMMUNITY. • ATTRACTIVENESS OF POTENTIAL NEW INDUSTRIES TO LOCAL AREA. (USE PRODUCT OF EACH TOTAL RATING) SELECTION OF POTENTIAL NEW INDUSTRIES FOR PLANNING PURPOSES.	(2.5) DETERMINE SOCIO-ECONOMIC VALUE RATING OF EACH OF THE OCCUPATIONAL TRAINING NEEDS USING CRITERIA AS: • OCCUPATIONAL DENSITY • OCCUPATIONAL GROWTH • LABOR SHORTAGE • SKILL LEVEL SELECTION OF COURSES OF OCCUPATIONAL INSTRUCTION.	(3.5) DETERMINE RATINGS FOR EACH COURSE/RESOURCE COMBINATIONS USING CRITERIA SUCH AS: • SOCIO-ECONOMIC VALUE • RESOURCES COST/STUDENT • VALUE RATING/COST • FUNDING AVAILABILITY • COURSE ATTRACTIVENESS SELECTION OF VOC. ED. PROGRAMS
SYNTHESIS SYNTHESIZE SELECTED APPROACHES INTO A SYSTEM OR PLAN. (INPUT TO THE FOLLOWING PLANNING LEVEL)	(1.6) LOCAL AREA SOCIO-ECONOMIC DEVELOPMENT PLAN • RESOURCE DEVELOPMENT PROGRAMS. • INDUSTRIAL DEVELOPMENT NEEDS. • ARRANGEMENTS WITH INDUSTRIES. (INPUT TO LEVEL 2)	(2.6) LOCAL AREA VOCATIONAL AND TECHNICAL EDUCATION PROGRAM (AS DEFINED BY) • OCCUPATIONAL FIELDS. • COURSES OF OCCUPATIONAL INSTRUCTION. (INPUT TO LEVEL 3)	(3.6) LOCAL AREA VOCATIONAL AND TECHNICAL EDUCATION PROGRAM • OCCUPATIONAL FIELDS. • COURSES OF OCCUPATIONAL INSTRUCTION. • RESOURCE REQUIREMENTS. • COST ESTIMATES AND FUNDING SOURCES. (LEVELS 2 & 3 ARE ITERATED)

(4:211)

Systems Model Number 2

1. Stanley Young, Professor of Management, School of Business Administration, University of Massachusetts.

   Charles E. Summer, Columbia University, Consulting Editor to Scott-Foresman and Company.

   Management: A Systems Analysis, Glenview, Illinois: Scott-Foresman and Company, 1966.

   Search of professional literature failed to reveal documentation.

2. Assumptions which the author appears to make about the decision-making model are:

   a. Specific recommendations for achieving total integration of a decision-making system have not yet been developed.

      1) Decision-making is synonymous with problem solving.

      2) A decision-making model is a construct which simply shows how decisions might be made.

      3) Decisions are made at each stage as a problem flows through a system.

      4) Decision-making can be approached through several disciplines; i.e., statistics, economics, mathematics, sociology, psychology, etc.

   b. The proposed model is linear in the same sense that problem solving techniques are linear. Problem solving generally is sequential in nature -- raising the problem . . . search for solutions . . . implementation . . . etc.

   c. The proposed model is a partially closed system.

   d. Any decision-making model must be congruent with management organizational philosophy.

3. Major steps of the model and suggested techniques appropriate to each step follow:

Steps	Techniques
a. Definition of Organizational objectives	Welfare, utility, benefit, or value measurement theory
b. Raising the problem	Sampling theory and reliability analysis
c. Isolating determinents	Correlation - partial or multiple, regression analysis, factor analysis, model building, controlled laboratory experiments, historical analysis, personal estimation, logical deduction
d. Search for solution	Search theory, heuristics, information theory, programming -- linear and non-linear, simulation
e. Selection for best solution	Simulation, heuristics, programming -- dynamic, invention, probability theory, sampling theory
f. Consensus	Group dynamics, information theory
g. Authorization	Theory of risk
h. Implementation	Critical path, PERT
i. Direction	Cybernetics, servo-theory, sampling theory
j. Auditing	Sampling theory, reliability, servo-theory, information theory

4. The author detailed a four and a half year participation in the design and installation of an actual decision-making system for a 250-bed general hospital. This was a case study which demonstrated the feasibility of planning, installing, and controlling a planned decision-making system which was designed in terms of management problems that emerged.

5. The model analyzed by the author was a suggested one. It was used to illustrate the design and indicate the nature of a management

system. While the terminology employed and the illustrations used might suggest that the system would be appropriate for business, industry, or institutional use, the system could be modified to fit the requirements of an educational enterprise.

6. The model contains a high degree of specificity.

Systems Model Number 3

1. Gore, William J., Department of Government, Indiana State University, Administrative Decision-Making: A Heuristic Model. John Wiley and Sons, Inc., New York, 1964.

Documentation: American Political Science Review, 59 - 469, June, 1965.

"This book is a major contribution to organization theory . . . Perhaps most significant . . . is its implication for total political systems . . . if his generalizations are true for simple organizations . . . as well as for the operation of larger political systems . . . (the book) is tightly written . . . it is likely to frighten away or lose those who most need its message . . ." by Donald Smithburg.

American Sociological Review, 30:638, August, 1965. "The presentation of the model is largely descriptive . . . The few illustrations given are . . . short, very general . . . The style is uneven . . . the organization leaves more than a little to be desired . . . The last few chapters, dealing with decision-making and organizational models . . .are well written . . . the book will provide thoughtful reading for those working on topics it covers . . ." by J. A. Litterer.

2. Several assumptions are advanced by the author:

   a. Rational systems of action are the organizing mechanisms of society. They presuppose an understanding of causes and effects, also a stability of goals.

   b. The heuristic process is oriented toward the relationship between personal values and ideology.

      1) Through the heuristic process, the private world of one individual is linked both to others and to the collectively constituted world.

      2) The emotional motivations that energize the formal (rational) organizational system are released by the heuristic process.

   c. The decision-making process links the conception of organization as a rational system with the conception of organization as a social system, or as a collective heuristic strategy.

   d. Heuristic decisions are mental and vicarious; they involve people in thinking about things instead of doing them. Decision-making is choosing, not between alternative courses of action, but between alternative goals.

3. Major Components and Phases of the Heuristic Model

Phases	Components
a. Perception	1) Tension articulated as problem
	2) Contingent response
	3) Situation identified as indeterminate
	4) Characterization of stimulus
	5) Determining reaction level
	6) Development of orienting set

Phases	Components
b. Evaluation Set	1) Reorientation to search for meaning of situation
	2) Search for ideological meaning of situation
	3) Definition of organization's stake in situation
	4) Articulation of organization's stake in situation
	5) Consideration of costs of potential action
	6) Causal identification of alternative responses
	7) Declaration of cost in mounting responses
	8) Evaluative set defined in terms of stakes and costs
c. Estimation of Consequences	1) Reorientation to estimation of consequences
	2) Reconnaissance
	a) environment
	b) power centers
	3) Initial formulation of cooperative preference structure
	4) Initial attempt to define structure
d. Maneuver for Position	1) Reorientation from internal to environmental interaction
	2) Definition of decision space
	3) Review of attitudes toward potential response
	4) Review concessions that could be made to secure sanction
	5) Determination that sufficient sanction has been secured
	6) Public pronouncement of proposed response

A complete diagram is attached (Figure II).

4. The general model was formulated from conceptions developed through four research projects and was augmented by information taken from more than two hundred case studies involving more than fifty public and private agencies. Illustrative data, however, were restricted entirely to a city fire department.
5. While the ostensible interest of the author is city government, the model does not appear to be limited to the operation of governmental agencies. Actually, the model appears to be appropriate for use in nearly any sort or organized endeavor.
6. The model is of a middle-level of specificity.

Figure II

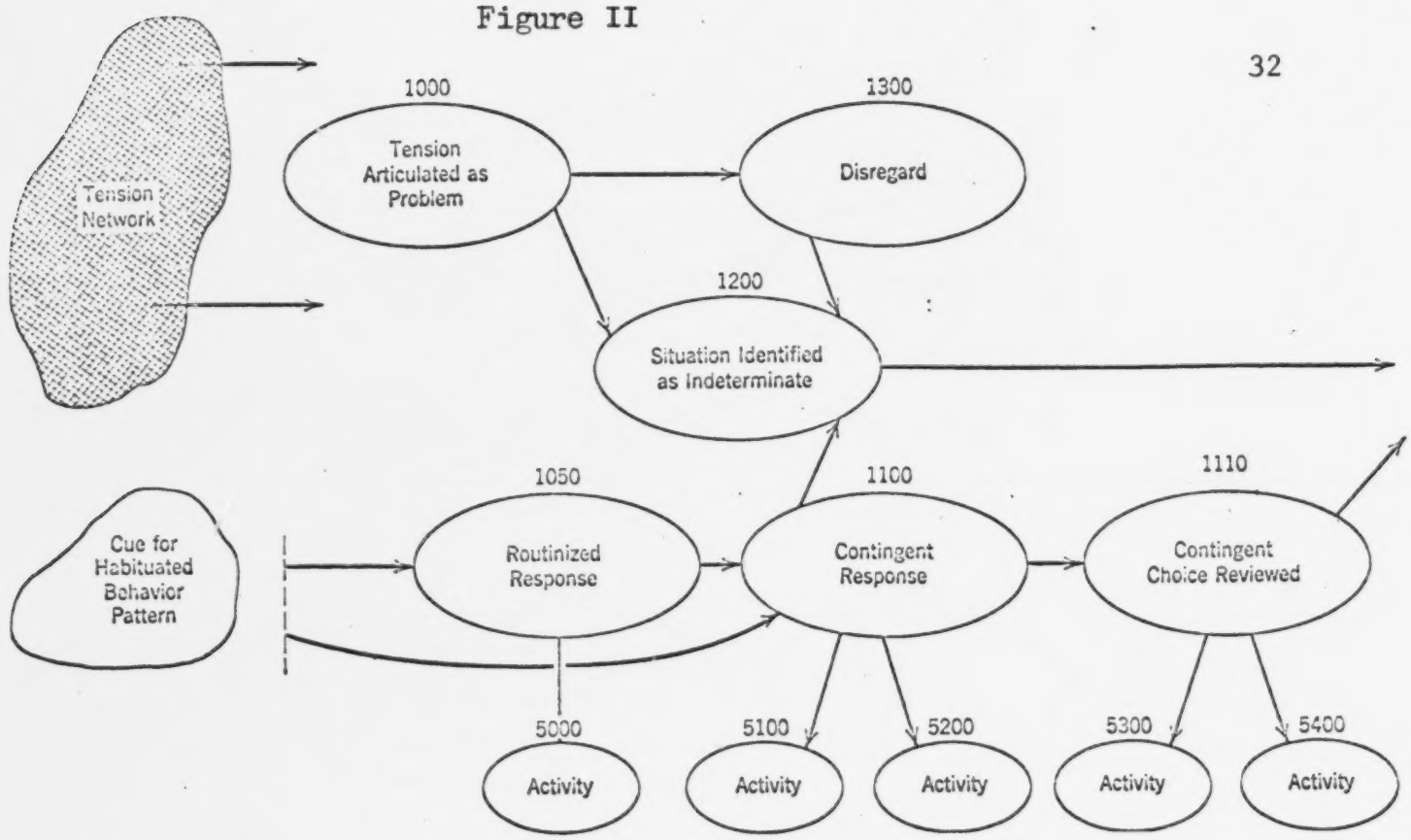


Chart 1 Perception.

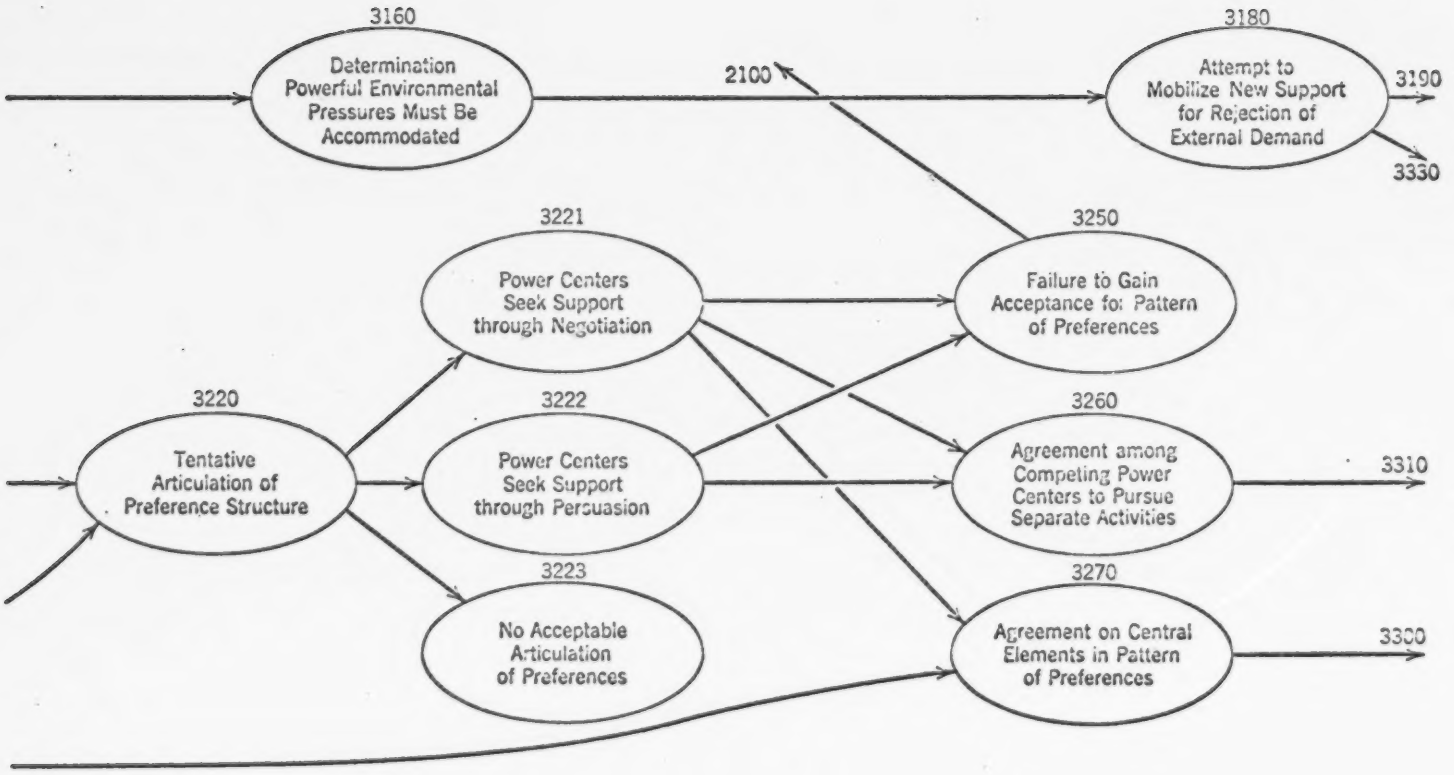


Chart 7 Estimation of consequences.

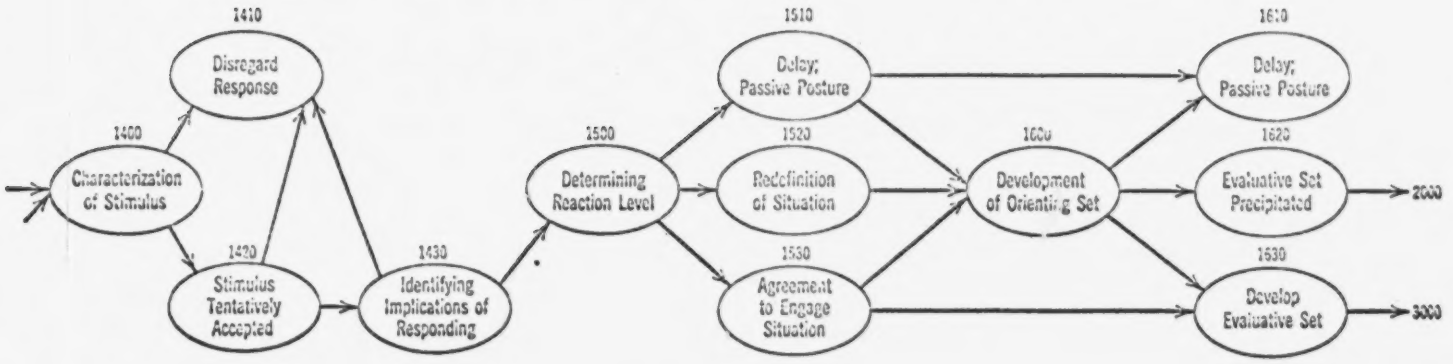


Chart 2 Perception.

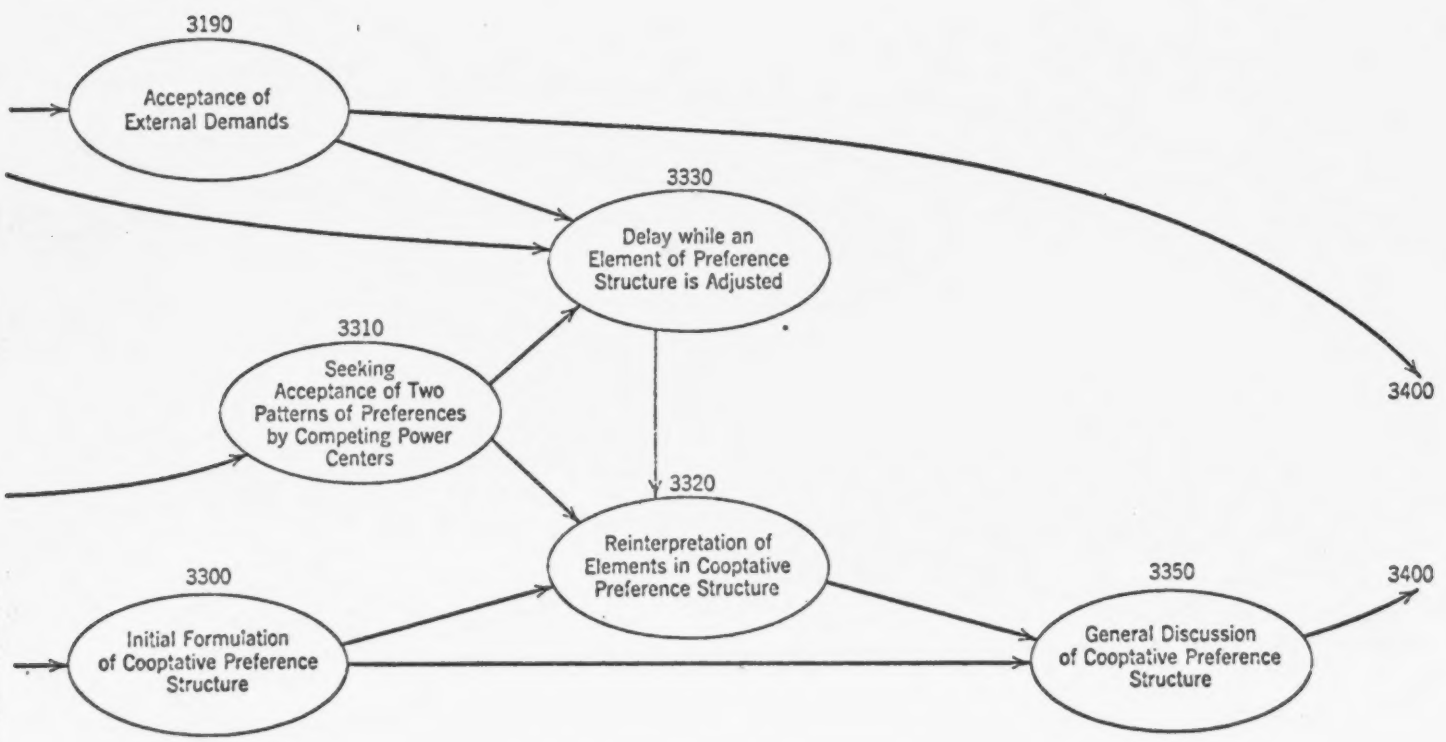


Chart 8 Estimation of consequences.

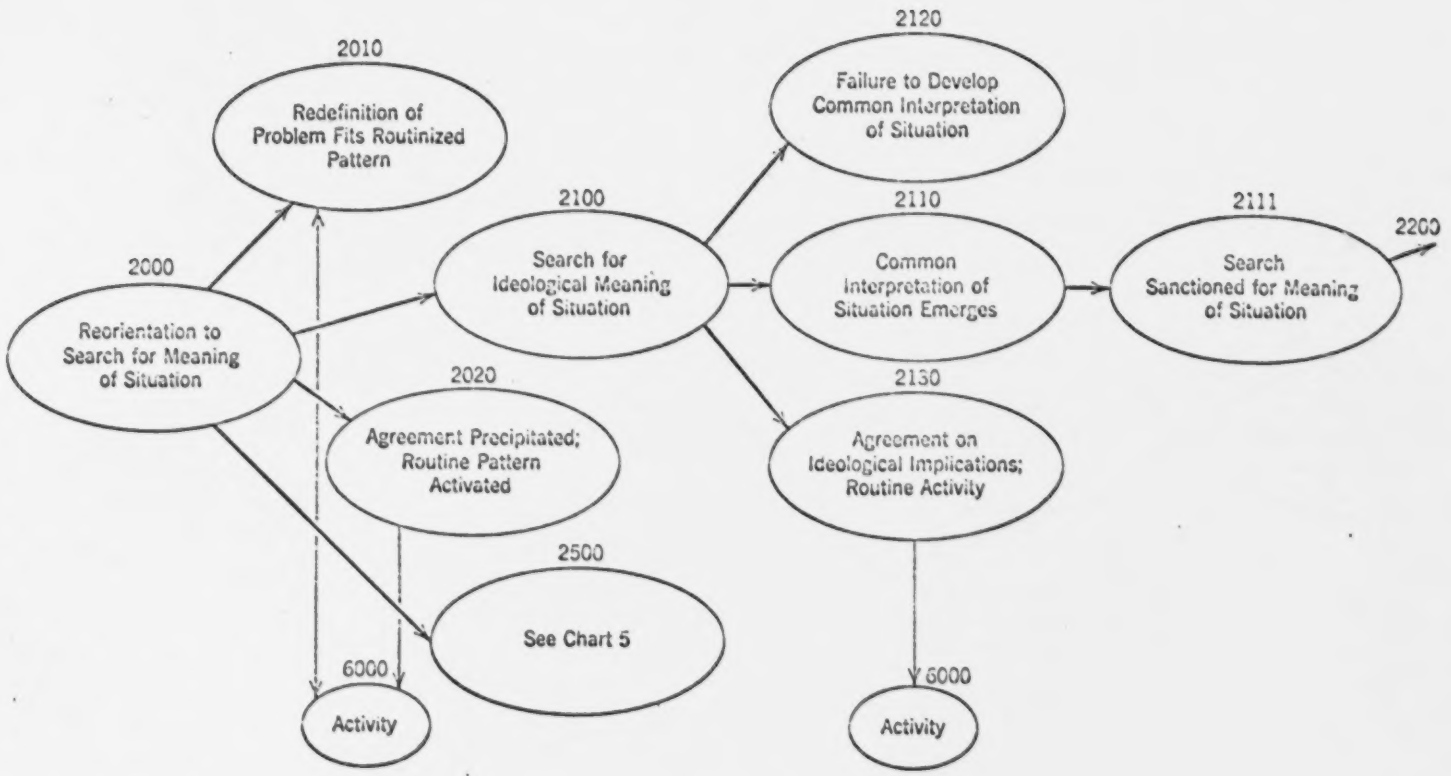
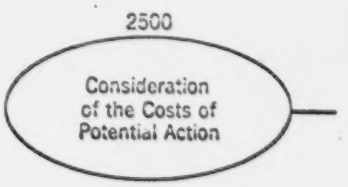


Chart 3 Evaluative set.



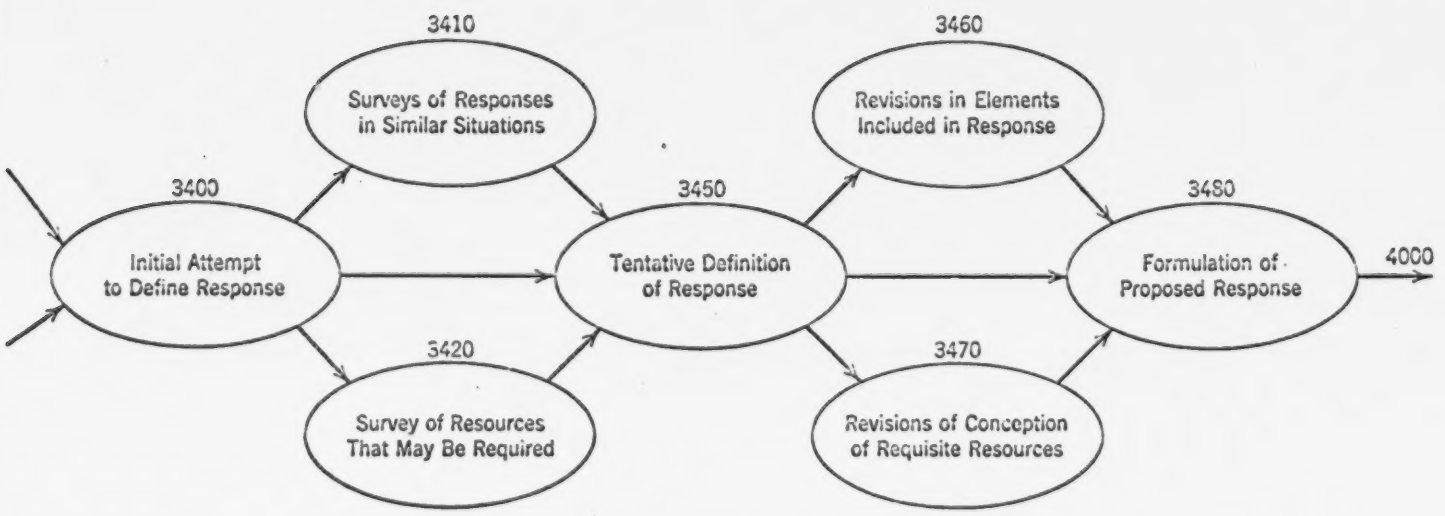


Chart 9 Estimation of consequences.

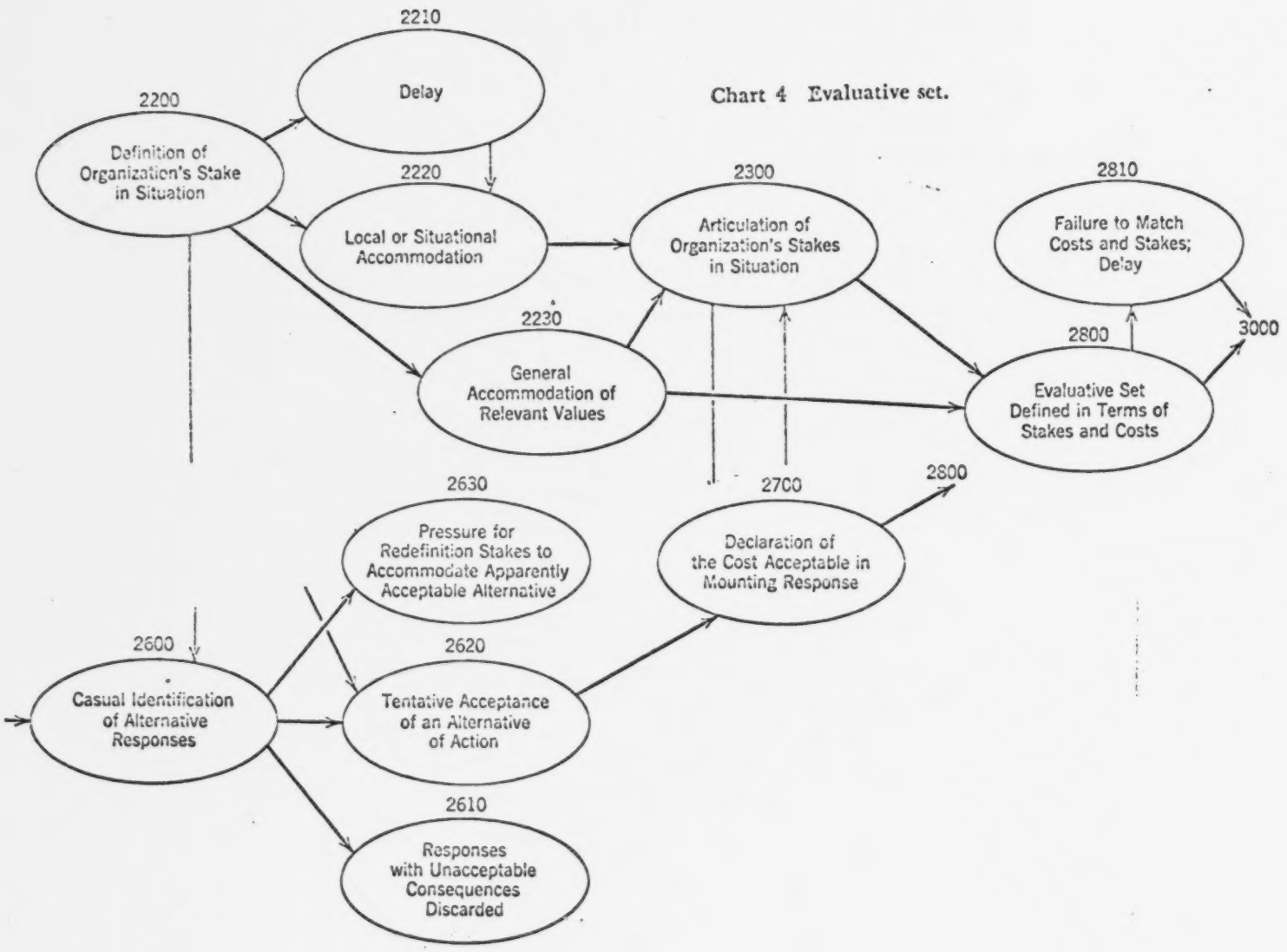


Chart 4 Evaluative set.

Chart 5 Evaluative set.

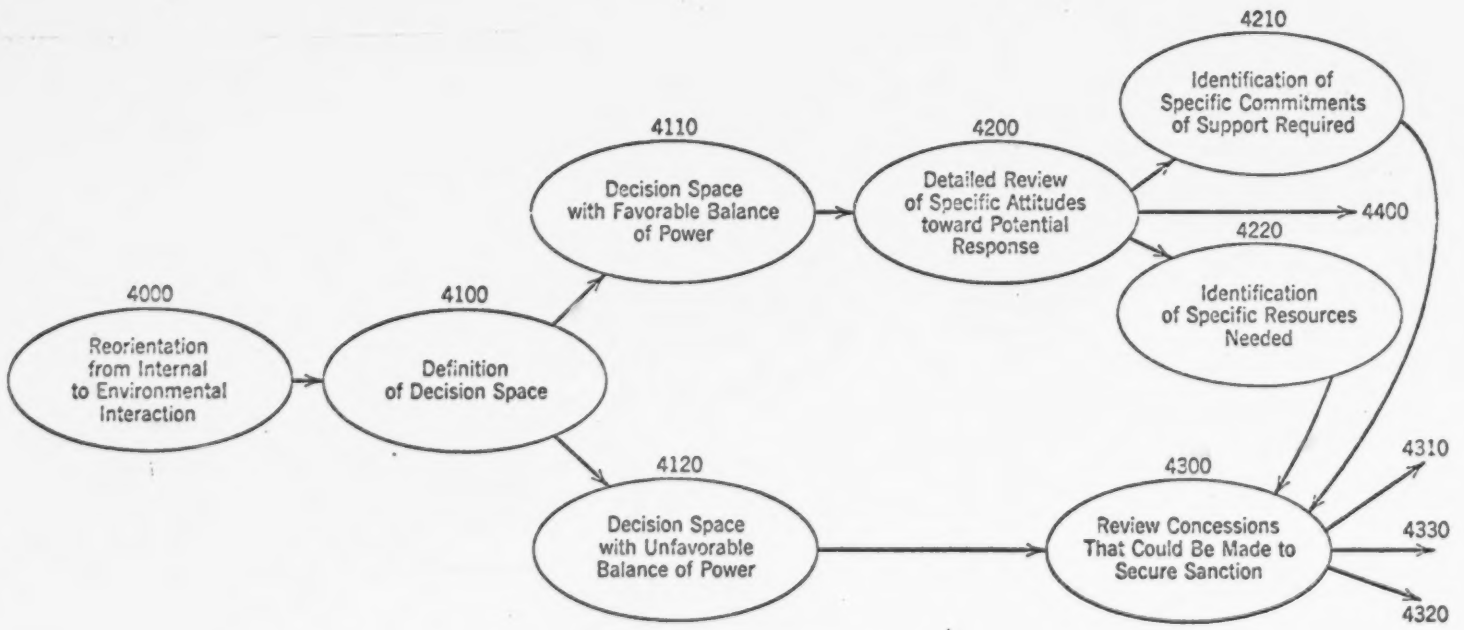


Chart 10 Maneuver for position.

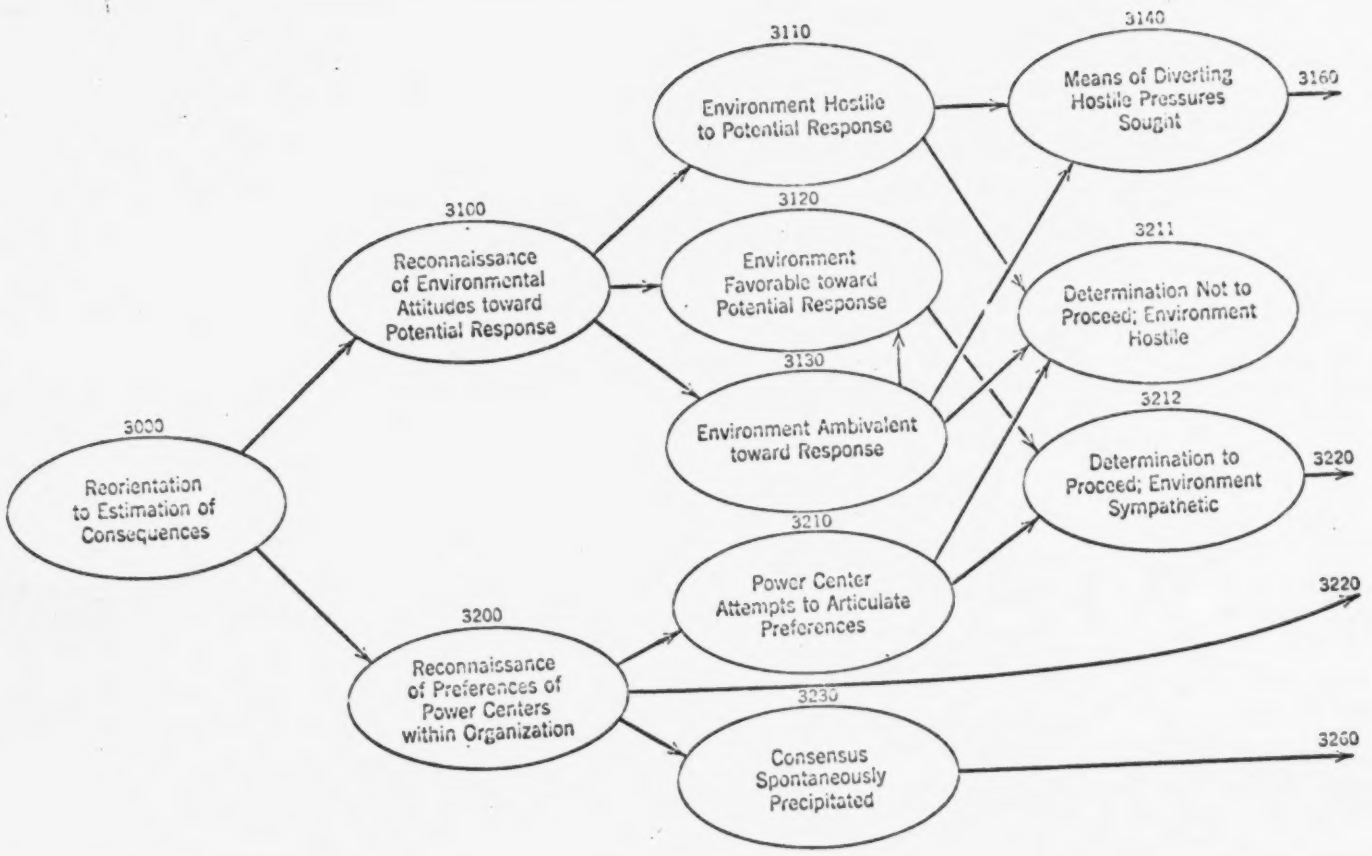


Chart 6 Estimation of consequences.

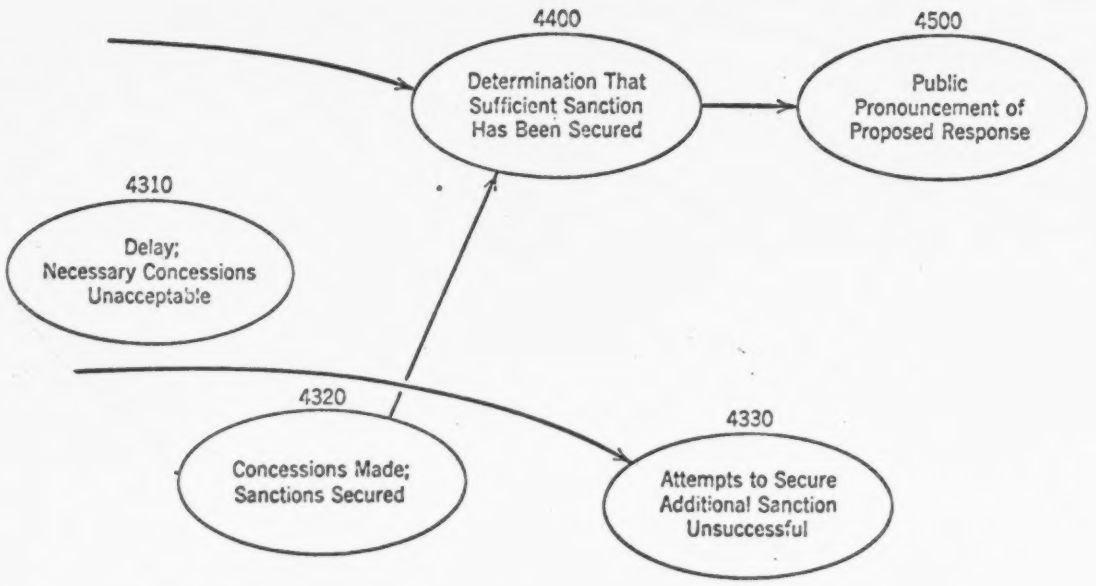


Chart 11 Maneuver for position.

MODELS FOR CURRICULUM EVALUATION

The investigators found the topic of curriculum evaluation to be more readily decemable in the literature. The work of Glass (21) showed four basic models for evaluation which he labeled accreditation, Tylerian, management-systems, and summative-composite.

Consultants, Sjogren and others, pointed out that the accreditation and Tylerian models have been applied most often in the past, but the appropriateness of these models for developmental efforts is limited. The accreditation model applies arbitrarily arrived-at standards for judging a program and the Tylerian model focuses mainly on measuring the attainment of objectives, tending to ignore inputs and processes.

Project consultants felt that either a management-systems or a summative-composite model would be most appropriate for this developmental project and presented an example of each.

The management-systems model selected for presentation is by Stufflebeam (53) and the summative-composite model is by Stake (51). Subsequent paragraphs present each model as described by the project consultants, Sjogren and others (47), and also suggests the kinds of data that would be included in either model.

Stufflebeam Model

The evaluation model developed by Stufflebeam is rather complex and is primarily oriented toward decision-making. Robertson (42) has presented a discussion of its application to the evaluation of vocational programs

in general. The evaluation of the American Industry Project (36) is designed as a management-systems approach very similar to the Stufflebeam model.

Stufflebeam has identified four kinds of evaluation: context, input, process, and product. The four first letters of these words have been used to form the acronym to name the CIPP evaluation model. Figure III on the following page is taken from the Stufflebeam paper. The material in this figure provides a useful, general description of the methods and purposes of each of the four kinds of evaluation.

Whether a context, input, process, or product evaluation is the intention, the logical structure of activities, as suggested by Stufflebeam, will be the same. These activities are summarized in Figure IV.

Some specification of these activities and suggestions as to methodology and available instrumentation is available to a limited extent in the literature: Worthen (68), Wallace and Shavelson (66), Burger and Cass (13), and Caldwell (14).

Figure 1

The CIPP Evaluation Model

A Classification Scheme of Strategies for Evaluating Educational Change

The Strategies

	Context Evaluation	Input Evaluation	Process Evaluation	Product Evaluation
OBJECTIVE	To define the operation context, to identify and assess needs in the context, and to identify and delineate problems underlying the needs.	To identify and assess system capabilities, available input strategies, and designs for implementing the strategies.	To identify or predict, in process, defects in the precedural design or its implementation, and to maintain a record of procedural events and activities.	To relate outcome information to objectives and to context, input, and process information.
METHOD	By describing individually and in relevant perspectives the major subsystems of the context; by comparing actual and intended inputs and outputs of the subsystems; and by analyzing possible causes of discrepancies between actualities and intentions.	By describing and analyzing available human and material resources, solution strategies, and procedural designs for relevance, feasibility and economy in the course of action to be taken.	By monitoring the activity's potential procedural barriers and remaining alert to unanticipated ones.	By defining operationally and measuring criteria associated with the objectives, by comparing these measurements with predetermined standards or comparative bases, and by interpreting the outcome in terms of recorded input and process information.
RELATION TO DECISION-MAKING IN THE CHANGE PROCESS	For deciding upon the setting to be served, the goals associated with meeting needs and the objectives associated with solving problems, i.e., for planning needed changes.	For selecting sources of support, solution strategies, and procedural designs, i.e., for programming change activities.	For implementing and refining the program design and procedure, i.e., for effecting process control.	For deciding to continue, terminate, modify or refocus a change activity, and for linking the activity to other major phases of the change process, i.e., for evolving change activities.

Figure IV

Developing Evaluation Designs

1. Focusing the Evaluation
   a. Identify the major level(s) of decision-making to be served, e.g., local, state, or national.
   b. For each level of decision-making, project the decision situations to be served and describe each one in terms of its locus, focus, timing, and composition of alternatives.
   c. Define criteria for each decision situation by specifying variables for measurement and standards for use in the judgment of alternatives.
   d. Define policies within which the evaluation must operate.
2. Collection of Information
   a. Specify the source of the information to be collected.
   b. Specify the instruments and methods for collecting the needed information.
   c. Specify the sampling procedure to be employed.
   d. Specify the conditions and schedule for information collection.
3. Organization of information
   a. Specify a format for the information which is to be collected.
   b. Specify a means for coding, organizing, storing, and retrieving information.
4. Analysis of Information
   a. Specify the analytical procedures to be employed.
   b. Specify a means for performing the analysis.
5. Reporting of Information
   a. Define the audiences for the evaluation reports.
   b. Specify means for providing information to the audiences.

c. Specify the format for evaluation reports and/or reporting sessions.

d. Schedule the reporting of information.

6. Administration of the Evaluation

a. Summarize the evaluation schedule.

b. Define staff and resource requirements and plans for meeting these requirements.

c. Specify means for meeting policy requirements for conduct of the evaluation.

d. Evaluate the potential of the evaluation design for providing information which is valid, reliable, credible, timely, and pervasive.

e. Specify and schedule means for periodic up-dating of the evaluation design.

f. Provide a budget for the total evaluation program.

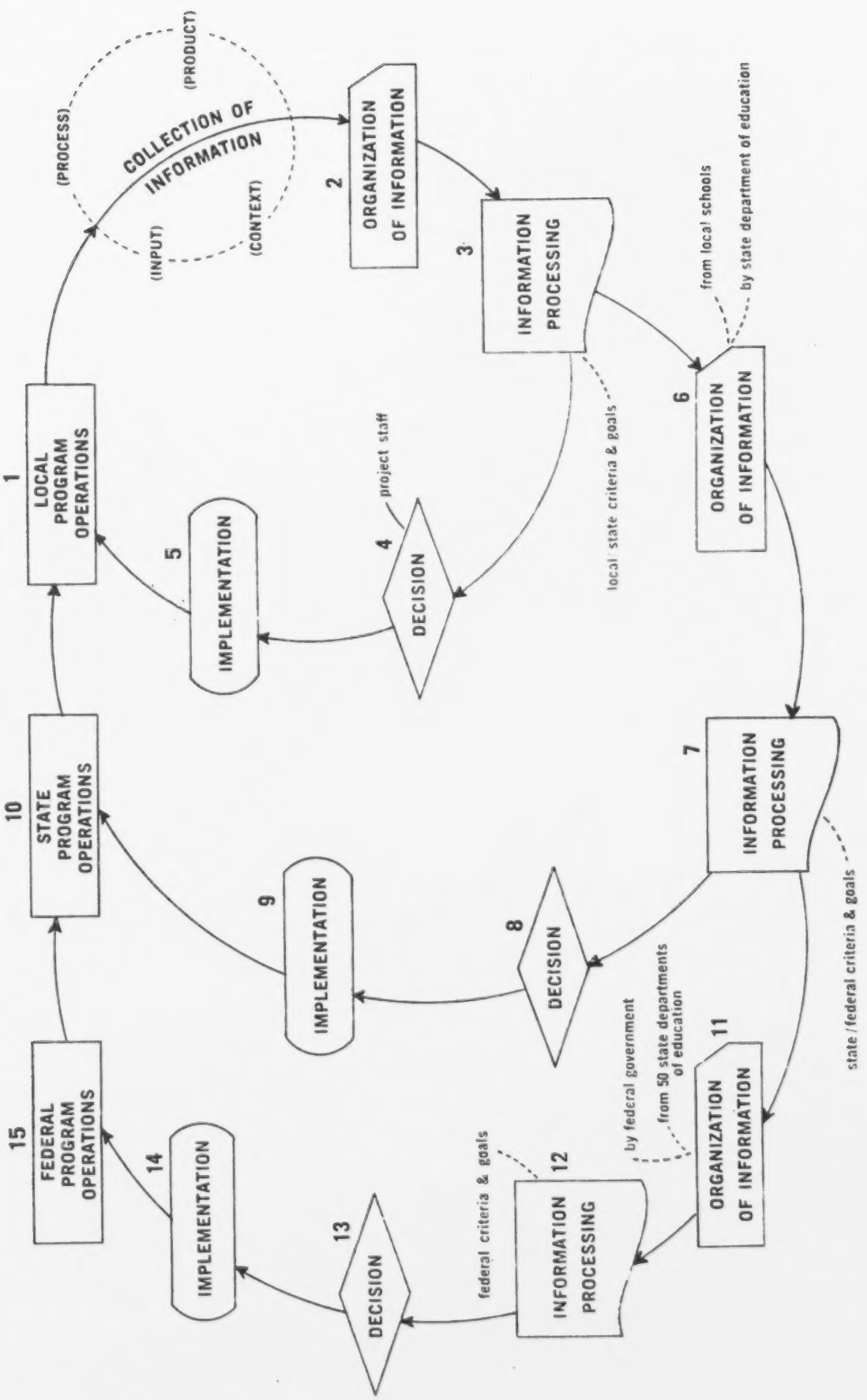
The Stufflebeam model is quite complex in two respects. First, as indicated above, it includes many kinds of data. Second, it attempts to establish a system whereby the evaluation efforts are coordinated across levels of evaluation. Figure V from the Stufflebeam paper illustrates a system for coordinating evaluative efforts at the local, state, and Federal levels.

The figure illustrates coordination of evaluation efforts at three levels of government. Boxes one, ten, and fifteen could be labeled differently, however, and the feedback control loop could be adopted as a general plan for local program situations. For example, box one might have the label of individual course or learning experience, box ten might be labeled local program operations, and box fifteen labeled state program operations. Thus, for each course or learning experience there would be context, input, process, and product information. This information would be used to make decisions about the course and would also be fed into the overall program evaluation. These data from all of the learning experiences would provide the bulk of the information for evaluating the total program, as well as basic information for reporting into the state evaluation systems. At the top of the loop there would be feedback or information provided from the state to the local program in terms of state needs. This information, along with the self-evaluation, would be used at the local level to make decisions about the local program and the learning experiences in the local programs.

The CIPP model provides a useful way of planning an evaluation effort in that it specifies to a great extent the kinds of data that are

Figure V

Feedback Control Loop:
Evaluation in Federally Supported
Educational Programs



needed in evaluation. It also clarifies the evaluation task by its provision for evaluation at different levels, and the fact that at each level the data and information needs might differ somewhat, but they can and should be complementary. The consultants pointed out that the Development and Evaluation Model presented as an example in the project proposal incorporates many of the features of the Stufflebeam Model, especially with respect to the context and input kinds of evaluation.

Stake Model

The Stake Model is similar in many respects to the Stufflebeam Model. It is perhaps less complex in appearance in that it does not attempt to specify the coordination of evaluation across levels. On the other hand, the Stake Model is somewhat more complex in its emphasis on gathering standards and judgments as part of the evaluation task. Figure VI is taken from a paper by Stake (51) and is a presentation of the Stake Model.

According to the Stake Model, the evaluation task is to first identify the intents of the program in terms of antecedent conditions, transactions to occur in the program, and outcomes. Furthermore, the intended contingencies among the antecedents, the transactions, and the outcomes are specified. An early task for the evaluation is to determine what evidence is available to support the stated contingencies.

The intents determine much of the data gathering activity of the program evaluation. The observations column represents the fact that some kind of procedure will be used to determine whether the intents are fulfilled.

The model as presented suggests that standards are used to compare the intents with the observations, and that judgments are made on the basis of the standards. The standards are often difficult to establish. In some cases, a norm or reference group might be a standard, a standard may be arbitrarily established by the program staff, or a group of experts might set some standards such as in the accreditation type evaluation. A task of the evaluation is to define at lease some of the standards against which the observations are judged.

The model is somewhat misleading in that it infers a linear progression from intents to observations to standards to judgments. Certainly some of the evaluation will proceed in this manner, but variations will occur. For example, it would be important for the evaluator to obtain judgments of various people about the intents even before the program starts. Are the objectives of the program the right ones? What is missing from the program? These are the kinds of judgments that are needed early in the program.

The Stake Model is unique in its emphasis on judgments as important evaluation data. The standards and judgments columns might well be considered as permeating the intents and observations rather than the linear arrangement it seemingly portrays.

SPECIFIC EVALUATION SUGGESTIONS

The consultants made it clear that in making recommendations for evaluation designs, it is difficult to separate development and evaluation. They are different functions; but, to be effective, they

Figure VI

Illustration of Data Possibly Representative of the Contents of Four Cells of the Matrices for a Given Educational Program *

PROGRAM RATIONALE	DATA FOR THE EVALUATION OF AN EDUCATIONAL PROGRAM			
	Intents Sources	Observations Sources	Standards Sources	Judgments Sources
ANTECEDENTS Student Characteristics Teacher Characteristics Curricular Content Curricular Context Instructional Materials ..... A Physical Plant School Organization Community Context				
TRANSACTIONS Community Flow Time Allocation Sequence of Events ..... D Reinforcement Schedule Social Climate				
OUTCOMES Student Achievement ..... B ..... C Student Attitudes Student Motor Skills Effects on Teachers Institutional Effects				

Example A: Manufacturer Specification of an Instructional Materials Kit
Example B: Teacher Description of Student Understanding
Example C: Expert Opinion on Cognitive Skill Needed for a Class of Problems
Example D: Administrator Judgment of Feasibility of a Field Trip Arrangement

*Adapted from: Robert E. Stake. "The Countenance of Educational Evaluation." Teachers College Record 68 (7): 529; April, 1967. Used by permission.

must be highly integrated with each other. The consultants pointed out that the project will do many things in the name of curriculum development that also might be called evaluation. They went on to say: "This is not surprising when evaluation is regarded as a process and a part of the management system. The point of all this is that, for some readers, the following suggested activities will seem to have much redundancy with the development activities. There is much redundancy. In fact, the suggested activities can be done in the name of development or evaluation. Whatever the rubric, the activity is done to obtain information for decision-making." (47)

The suggestions presented by Sjogren and others were numbered for purposes of organization and the numbers do not indicate any ranking:

1. The evaluation plan should use the feedback loop idea so that there is coordination between the evaluation at the course and learning experience level and the program level.
2. The evaluation plan should provide for description of context. Actually, the project proposal indicates that this is being planned. Data and information about the context would include the following:
   a. State, regional, and local manpower need information.
   b. Economic and business indicators for the state and locality.
   c. Potential student clientele.
   d. Demographic data for the state and locality.
   e. Training and educational programs available in locality and state.

Most of these kinds of data are available from other sources and the task is that of accumulating and integrating the data into the system rather than gathering original data.

The data and information about the context should permit decisions about the program. The credibility test described on pages 13 and 14 of the proposal indicates the kinds of standards and judgments that can be used at this point. Context data should be systematically updated so that the program will be kept current with the circumstances in the community and region.

3. When a decision is made about a program, the intents of the program will be specified in terms of antecedents (inputs), transactions (processes), and outcomes (products). The evaluation should provide for defining and examining the intents in terms of support from theory and research and feasibility. The feasibility test described in the proposal on pages 15 - 18 is part of the judgment process at this point.

This phase will occur at the program level and also at the individual course or learning experience level.

4. Specific input or antecedent data would include the following in terms of intents and observations:
   a. Characteristics of students at entry into the program such as age, sex, prior education, abilities, attitudes, etc.
   b. Characteristics of program staff such as age, work experience, education, teaching experience, abilities, etc.

c. Kinds of instructional materials available in terms of content, number, condition, etc.

d. Kinds of equipment and facilities available in terms of variety, amount, condition, etc.

e. Sources of support for the program in terms of money, equipment, work stations, etc.

5. Transaction or process data would include the following:

a. Specification of curricular content, sequence of courses and learning experiences, time allocations, etc.

b. Description of communication flow among participants and staff.

c. Participant observation data on courses and learning experiences.

d. Social climate in the program.

e. Descriptions of unintended events and variations.

6. Outcome or product data would include the following:

a. Student performance data on skills, attitudes, and abilities obtained periodically through the program from teacher evaluations, self-evaluations, and special evaluation by the evaluator.

b. Changes in program staff.

c. Description of products of the program; papers, books, course guides, etc.

d. Follow-up of the program participants to determine their behavioral adequacy in job situations.

e. Cost data of the program in terms of time and dollars.

These are suggested basic data requirements for the evaluation. The evaluator will also need to assist in determining standards for judging the adequacy on the "goodness" of the information. The standards and judgments might well be obtained from various interested groups like employers, employees, professional educators, advisory committee members, etc. It is important to recognize that the standards and judgments will likely vary across different constituent groups. By knowing this variation, the decision-makers will be better able to identify potential sources of support or resistance to the program.

The suggested data are useful only if there is a plan to analyze, interpret, and integrate the results into the management system. The feedback control loop should be helpful for this purpose. Whether it is seen as operating on the individual or institutional level, the control loop contains three primary phases: decision, implementation, and collection of feedback. These phases and their subdivisions are diagramed in Figure VII.

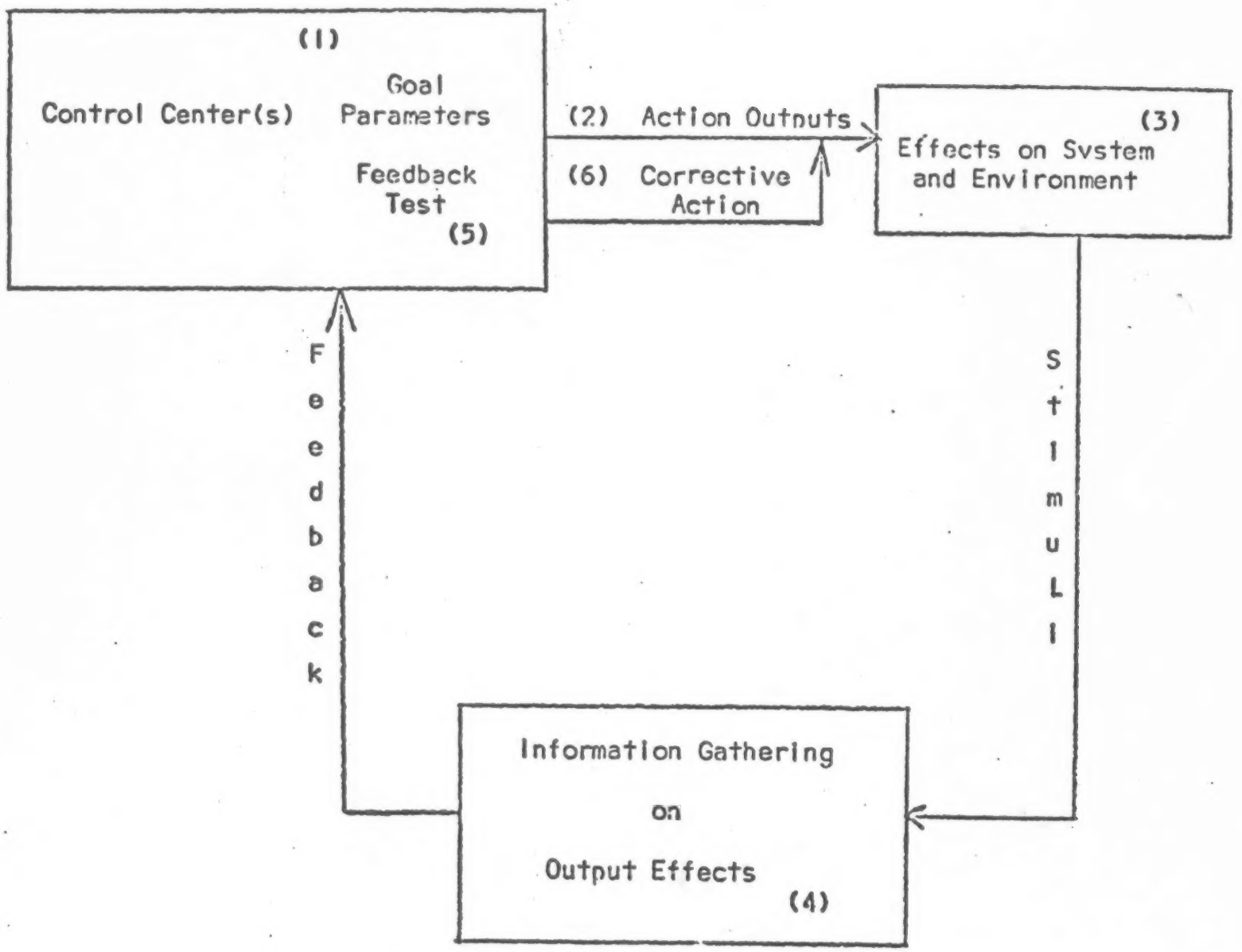
An Investigation of the Economic Implications of Planned Curriculum

The rationale for the project stresses the need for a decision-making system to guide curriculum planners in curriculum development and evaluation. Suggesting this type of planning and decision-making lead the investigators to be concerned with the relationship between planned curriculum and the social and economic growth of a nation.

With this concern in mind, the investigators specified this as an important Phase I task and requested a consultant to report on the

Figure VII

The Self-Correcting Feedback Loop



relationship between the following components: (See Appendix I - C, p. 3.)

1. Expansion and recession of occupations within the labor force and GNP.
2. Breadth or specialization of preparation and GNP.
3. Demand for preparation of a given occupational type -- proportion of the type -- and recession of demand.
4. The changing relationship between population, level of education, GNP, nature of the labor force, and types of education.

Consultant, Dr. Lorry Sedgwick, reporting on his review of the literature for this task, stated: "As the result of this research, I found that answers to the question posed are not readily available, because it has been only recently that the effect of an educated manpower on GNP has been recognized." (44)

Sedgwick further concluded that as far as he was able to determine, operational procedures for accurately and effectively identifying the relationship between a planned curriculum and the social and economic growth of a nation have not yet been developed.

The literature review showed that the available literature on this subject was written by economists rather than by educators and about 90% of it since 1960. Sedgwick suggests that in view of this fact, those persons engaging in educational planning must learn to communicate with economists.

Most of the concern for educational planning stems from two areas of economic thought: manpower forecasting and decision-making covering

capital investment allocations (more recently termed cost benefit). These decisions are in the realm of economic planning and government control.

Another factor of increasing concern is the "residual" or human factor, sometimes called the organizational factor. Only recently has this factor been recognized. Before the recognition of this factor, labor productivity was determined by the amount of real capital employed per working place; the more capital, the more the productivity. However, it has been shown that factors other than real capital determine the rate of productivity increase. This human factor is the trend component of the labor productivity.

Since the existence of this factor has only lately been acknowledged, both theoretical and empirical research is just now beginning to determine the real effect of the human factor. There are reports which give figures from 23% to 48% of GNP. Unfortunately, this human factor is not differentiated, so it cannot be determined whether it is the first six grades of general schooling, the Ph. D.'s or training as plumbers which is providing the gain in GNP.

Only a few studies were located which discriminate between general education and vocational education. Even then it was unclear as to the type of vocational education referred to.

According to Sedgwick: "Probably the most significant article so far concerning the relationship of vocational education to GNP was written by W. S. Bennet on educational change and economic development. He

used data from UNESCO on the educational level and economic development of 69 nations and indicated that economic growth is not related to general secondary education as much as it is related to vocational education." (44)

In conclusion, Sedgwick stated: "It seems to me that this area is well worth pursuing in Phase II of the operation. The area seems to be developing fast enough so that we should be able to develop some usable guidelines; however, it will take a certain amount of 'returning' on the part of the investigator . . ." (44)

PHASE II PLANNING

Planning for Phase II has been initiated giving attention to the conclusions resulting from Phase I investigative activities. Figure VIII shows the major activities and their relationship planned for Phase II. The investigators wish to make clear that this is only a general network.

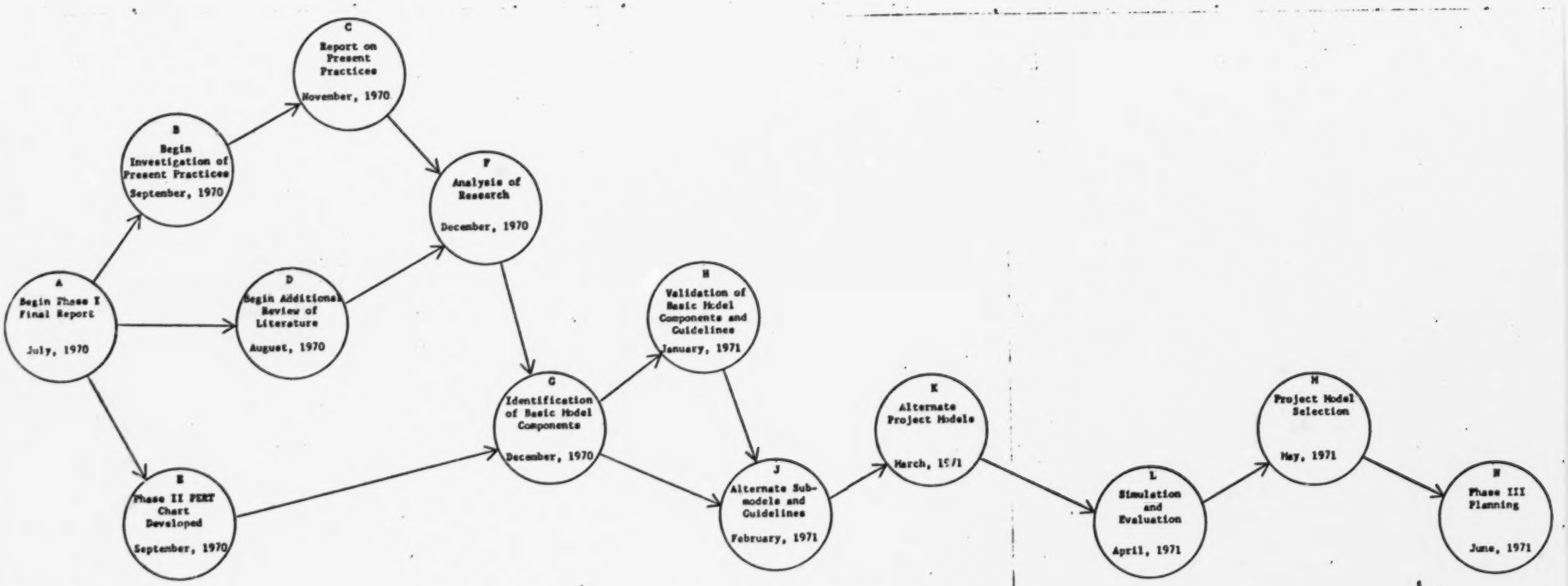


Figure VIII

General PERT Chart for Phase II

General Explanation of Phase II PERT Chart

A. Phase I Final Report -- Review and analysis of Phase I activities with respect to plans for Phase II.

B. Investigation of Present Practices -- To prepare a report on designs for gathering data on existing methods of curriculum identification, development, execution, and evaluation in selected institutions offering occupational programs in the State of Illinois.

C. Report on Present Practices -- Results of activities to be carried out as a result of the investigation of present practices.

D. Additional Review of the Literature -- Based on findings reported in Phase I task reports.

E. Phase II PERT Chart Development -- A more detailed PERT Chart will be developed as a project management system for the activities of Phase II.

F. Analysis of Research -- A final summary and analysis of the research activities will be made as a basis for future decisions.

G. Identification of Basic Model Components -- Based on the "Analysis of Research" and advice of consultants, basic components will be categorized. In particular, components that appear to be common to different models will be identified and categorized.

H. Validation of Basic Model Components and Guidelines -- Some of the basic model components and associated guidelines will be validated at Joliet Junior College while the final model is being developed.

J. Alternate Submodels and Guidelines -- Alternate model subsystems and their guidelines can be developed from the validated basic components.

K. Alternate Project Models -- Several different models can probably be built from the previously validated model subsystems.

L. Simulation and Evaluation -- Alternate models will be tested and evaluated by simulation of actual conditions and variables.

M. Project Model Selection -- Based on the simulation result, a model will be selected and further refined.

N. Phase III Planning -- Final report for Phase II and arrangements made for further development and testing of the model.

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A P P E N D I X I

A RESEARCH AND DEVELOPMENT PROJECT IN OCCUPATIONAL EDUCATION: THE DEVELOPMENT OF PROCESS MODELS FOR DECISION-MAKING IN CURRICULUM DEVELOPMENT AND EVALUATION

A RESEARCH AND DEVELOPMENT PROJECT IN OCCUPATIONAL EDUCATION: THE DEVELOPMENT OF PROCESS MODELS FOR DECISION-MAKING IN CURRICULUM DEVELOPMENT AND EVALUATION

Submitted By: Elmer W. Rowley, President
Joliet Junior College

Principal Investigators: Joseph A. Borgen
Dwight E. Davis

Submitted To: State Board of Vocational Education and Rehabilitation, Division of Vocational and Technical Education

Revised February 1, 1970
Amended May 29, 1970
For Phase II Funding Request

ABSTRACT

SUBMITTED BY: Mr. Elmer W. Rowley, President
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Illinois Junior College District #525

PRINCIPAL INVESTIGATORS: Joseph A. Borgen
Dwight E. Davis

TITLE: A RESEARCH AND DEVELOPMENT PROJECT IN OCCUPATIONAL EDUCATION: THE DEVELOPMENT OF PROCESS MODELS FOR DECISION-MAKING IN CURRICULUM DEVELOPMENT AND EVALUATION

OBJECTIVES:

1. To develop process models for curriculum development in occupational education.
2. To develop guidelines for the utilization and application of the process models.
3. To conduct a series of workshop sessions for the orientation of curriculum planners to the utilization of the process models.
4. To promote research on related problems.

PROCEDURE FOR IMPLEMENTATION:

1. Review the literature, meet with selected consultants, and conduct other investigations necessary to develop process models in the following areas of curriculum development and evaluation:
   a) Program Identification
   b) Program Development
   c) Program Implementation
   d) Program Execution
   e) Program Evaluation
2. Apply the models in a pilot setting at Joliet Junior College.
3. Develop guidelines for the application and utilization of the models with particular attention to the resources and evaluative criteria affecting each activity of the model.
4. Conduct workshop sessions with consultants and curriculum planners from other high schools and colleges in Illinois for refinement of the models and broadened applications for model testing.
5. Conduct workshop sessions in cooperation with teacher training institutions and the State Board Division of Vocational-Technical Education staff for training curriculum planners in the use of the models.
6. Conduct a program of dissemination related to the development, application, and testing of the models.

TIME: Beginning March 1, 1970 - Ending June 30, 1973

BUDGET: PHASE I = $31,466.00 (March 1, 1970 - June 30, 1970)
PHASE II = $84,128.00 (July 1, 1970 - June 30, 1971)
PHASE III, PHASE IV } To Be Negotiated

A RESEARCH AND DEVELOPMENT PROJECT IN OCCUPATIONAL EDUCATION: THE DEVELOPMENT OF PROCESS MODELS FOR DECISION-MAKING IN CURRICULUM DEVELOPMENT AND EVALUATION

INTRODUCTION

The annual report of vocational education in Illinois concludes that, "It is apparent that the task of providing broad occupational training programs which meet the needs of all has just begun. Illinois' prospective employees must bring to their jobs a basic degree of skill and technical knowledge. Only 20% will complete a baccalaureate in preparation for an occupation. Where and how will the remaining 80% obtain needed training?"(1)

The new state plan for vocational education and the vocational educational amendments of 1968(2) have mandated change in existing programs and expansion of vocational educational offerings and effectiveness to answer this question.

This new state plan and the amendments strongly imply past practices in preparing employable people for contemporary occupational demands have not been effective or comprehensive enough to meet the needs of young people in preparation for the public and private sectors of the world of work. To execute the mission put forth in this legislation many new programs must be identified, developed, and in turn evaluated to insure compliance with contemporary needs of the student clientele and employer consumer.

In order for the State of Illinois, local agencies, area centers, and post secondary institutions to do an effective job of program identification, development, execution, and evaluation, an innovative, systematic, and defensible plan must be developed to accomplish the task. This project purports to develop and test such a plan.

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(1) Annual Report: "Vocational Education in Illinois", Board of Vocational Education and Rehabilitation, Division of Vocational and Technical Education. July 1, 1967 to June 30, 1968, p. 28.
(2) "Vocational Education Amendments of 1968". Public Law 90-576, October 16, 1968

PURPOSE AND OBJECTIVES

This project proposal is based on the assumption that more systematic means must be developed to assist curriculum planners in the development of new programs and the continuous evaluation of on-going programs in occupational education.

It is suggested that the following questions serve as the basis of this investigation.

1. Can generalizable process models be developed to provide curriculum planners with a systematic decision-making procedure for program identification, program development, program implementation, program execution and program evaluation?

2. Is it possible to develop guidelines for the identification and utilization of resources and evaluative criteria in accomplishing the activities specified in the models?

The following general project objectives shall serve to give direction to the research activities undertaken as a part of this project in pursuit of solutions to the previous questions.

1. To develop process models for curriculum development in occupational education.

2. To develop guidelines for the utilization and application of the process models.

3. To conduct a series of evaluation workshops to assess the value of process models.

4. To test the applicability of the process models in a pilot situation and other settings.

5. To develop a plan for dissemination and in-service training for curriculum planners in the utilization of process models.

6. To promote research on related problems.

RATIONALE

Many expressions, verbal and documented, point to the need for organized state and local planning for the development of quality occupational programs. Past procedures and practices in the State of Illinois relative to program planning and evaluation have been substantially modified with the adoption of the new

state plan for vocational education. The new directions charted by this plan emphasize the need for a more defensible approach to curriculum development and evaluation. These new directions require conserted planning both on the state and local levels to adequately implement the intent of the legislation in the form of a quality comprehensive statewide program of vocational education.

This project purports to develop workable process models that could be applicable as a guide for local vocational education agencies in program development, and in turn for state level planning and decision-making.

PROCEDURES FOR IMPLEMENTATION

To accomplish the general objectives of this proposal a four-phase plan for investigation was developed. Funding for Phase I (March 1, 1970 to June 30, 1970) was subsequently granted as per the budget given in Appendix B.

PHASE I

Phase I was designated as a project planning period giving attention to the following:

A. Review of literature related to the development and application of *process models to curriculum development and evaluation.

B. The development of a position paper related to the applicability of process models to curriculum development and evaluation.

C. Identification of consultants and the organization of working conferences related to initial model development to be undertaken in Phase II of the project.

D. Future project planning giving consideration to:

1) Project Objectives
2) The involvement of State and local personnel
3) Project Testing and Evaluation
4) Dissemination
5) Budget

E. Phase I Final Report

---

* A definition of the term process model has been tentatively formulated as follows:

A graphic or written description of a step-by-step procedure that specifies the activities to be completed prior to decision-making and suggests the resources and evaluative criteria to be used, as well as the constraints that affect each decision.

Realizing Phase I is not scheduled for completion until June 30, 1970 it is not possible to include a complete report on activities completed. However, in Appendix C, a copy of the task list and task completion scheduled for Phase I is shown.

At the time of drafting this proposal all tasks are on schedule and the target dates for the position paper, final proposal, and final report should be met.

PHASE II - Initial Model Development and Testing, July 1, 1970 to June 30, 1971

It is Phase II that forms the basis for this amended proposal. The following objectives will provide the direction for this phase of investigation.

1. To prepare in graphic form one or more process models for decision-making in occupational and technical education curriculum development and evaluation.

2. To prepare written guidelines for the utilization of each process model developed.

3. To test the applicability of at least one process model and the corresponding guidelines in the curriculum development and evaluation activities at Joliet Junior College.

4. To secure the involvement of local curriculum planners and personnel from the offices of the Division of Vocational and Technical Education, State of Illinois, in the development and testing of the aforementioned process models.

5. To structure and formalize arrangements for the testing of one or more process models in local educational institutions other than Joliet Junior College, as well as at the State level during Phase III.

6. To develop and execute a plan for Phase II evaluation.

To accomplish the previously stated objectives for Phase II the following activities will be undertaken. The budget (along with personnel qualifications) proposed for completing these activities is contained in Appendix A.

A. Initial Model Development

1. The identification of model components will grow from:

a) Gathering data on present practices with regard to the procedures followed in curriculum development and evaluation by practitioners in Illinois secondary and post-secondary schools. It is the intent of the project staff to work with the State Board of Vocational Education staff and local school personnel to develop the means for gathering this information.

b) Consultation of an individual and group nature with educators, as well as those outside the field of education for the purpose of identifying model components. Working conferences related to this activity will stress the involvement of State Board staff and local curriculum planners in the development of model components.

c) Further review of existing research and literature will be conducted beyond that initiated in Phase I to aid in the identification of model components. This activity will be carried on by project staff with the assistance of consultants.

2. The preparation of alternate process models for curriculum development and evaluation

a) This activity will involve assimulating the information gathered in activity "1" of this phase and proposing various process models.

b) The preparation of these models will be accomplished with the reactions and inputs of State Board staff, local curriculum planners, project staff and consultants. This will be accomplished through a series of data gathering activities, individual consultation, and working conferences.

B. Initial Model Testing

1. In preparation for testing a model or models in a pilot situation at Joliet Junior College, persons involved in the preparation of these models will also work with the development of guidelines for their utilization.

2. Actual testing of a model or models at Joliet Junior College will be accomplished in conjunction with the development of a number of new occupational and technical curricula and the evaluation of on-going curricula.

3. The model or models and guidelines for the same will be studied to determine:

a) The appropriateness of the components or activities specified in the model or models.

b) The value of suggested resources to data gathering and decision-making.

c) The appropriateness of the evaluative criteria suggested for each decision-making activity.

d) The value of the constraints suggested for consideration when involved in decision-making activities.

e) The usefulness of the materials (in terms of format, clarity, etc.) prepared for use in the curriculum development and evaluation process.

C. Model Revision

1. The model or models utilized in the pilot test situation at Joliet Junior College will be revised on the basis of the reactions of those involved in their use as well as inputs from data gathering instruments, and other persons having participated in the initial development.

2. The guidelines and other printed materials will be evaluated by local staff and other persons involved in the preparation of the same.

3. Revisions in the model or models and guidelines will be made on the basis of information gathered through the previous activities.

D. Securing Other Test Centers

1. The selection of other test centers for a broadened testing of the model or models in other settings will be accomplished by recommendation of State Board staff and local curriculum planners having been involved in the developmental activities.

2. Procedures will be established to determine the methods whereby information gathered relative to the use of the model or models and guidelines can be analyzed.

3. The formulation of a plan for testing the applicability of a model or models and guidelines for State level planning will be developed. The implementation of this plan in Phase III will provide for all local institutions participating and the State Board to execute planning from a common base for decision making.

E. Project Evaluation in Phase II

It is proposed that an outside evaluation agency be employed on a consultative basis to assist in the evaluation, design and execution. Specific activities that must be accomplished in preparation for such an audit include:

1. Specify Phase II behavioral objectives.

2. Indicate relationship to project goals.

3. Develop an audit instrument for each objective, assess validity, reliability and practicality of instrument.

4. Describe tasks to be completed.

5. Describe personnel variable associated with objectives and tasks.

6. Determine data collection procedures, time, place, personnel, etc.

7. Design data analysis procedure.

8. Develop data reporting procedure.

9. Contact auditing agency for review of audit plans.

10. Revise audit plans.

11. Contact audit agency and finalize audit plans.

F. Phase II Final Report and Phase III Proposal

PHASE III - Revised Model Testing, July 1, 1971 to June 30, 1972

A. Implementation of Revised Model in Other Test Situations

Working conferences will be conducted with attendance by participating institutions for the purpose of evaluating the usefulness and acceptability of the model.

B. Final Model Revision

Working conferences will be conducted for the purpose of revising the model on the basis of data gathered in test center applications.

C. Phase III Final Report

PHASE IV - Evaluation and Dissemination, July 1, 1972 to June 30, 1973

A. Evaluation

Evaluation workshops will be conducted to assess the success of the project and develop a final report and position paper.

E. Dissemination

1. In-service training programs will be developed and conducted in cooperation with teacher training institutions and the State Board of Vocational Education staff for curriculum planners.

2. Preparation and publication of printed reports.

C. Project Final Report

COMMITMENT OF JOLIET JUNIOR COLLEGE

This proposal is prompted by a very real concern on the part of the administrative staff and faculty of Joliet Junior College for improving and systematizing the overall process of curriculum development and evaluation. Moreover, there is a definite concern on the part of the aforementioned individuals to be involved in an investigation having definite value to the profession as a whole.

Initial discussions of the intent of this project have resulted in the drafting of a tentative model for curriculum development and evaluation. Contained in Appendix D of this proposal is a graphic presentation and written description of work completed to date on said model.

APPENDIX A

PHASE II - BUDGET, BUDGET DESCRIPTION, AND PERSONNEL QUALIFICATIONS

APPENDIX A

PHASE II - BUDGET

July 1, 1970 - June 30, 1971

ITEM NO.	PROJECT STAFF	STATE FUNDS	LOCAL FUNDS	TOTALS
1.	1 Project Coordinator (full-time 11 months)	$ 17,000.00		
2.	1 Research Coordinator (full-time 11 months)	17,000.00		
3.	2 Secretaries (2 full-time)	8,100.00	2,700.00	
4.	1 Co-Director (25% time)		5,000.00	
5.	1 Co-Director (50% time)		6,750.00	56,550.00
	CONTRACTUAL SERVICES			
6.	Consultant Fees (70 consultant days @ $75/day)	5,250.00		5,250.00
	TRAVEL			
7.	Consultant Travel	5,950.00		
8.	Staff Travel	3,000.00		8,950.00
	MATERIAL AND SUPPLIES			
9.	Secretarial Materials and Printing	1,500.00		
10.	Audio-Visual Services	2,000.00	1,000.00	
11.	Resource Material		1,500.00	6,000.00
	OTHER			
12.	Rental of Office Space and Conference Rooms	5,000.00		
13.	Telephone	2,378.00		7,378.00
	TOTALS:	$ 67,178.00	$ 16,950.00	$ 84,128.00

PHASE II - BUDGET DESCRIPTION

Item No.

1. 1 Project Coordinator: To be employed full-time on an eleven-month contract.

2. 1 Research Coordinator: To be employed full-time on an eleven-month contract.

3. 2 Secretaries: To be employed full-time on an eleven-month contract.

4. 1 Co-Director: Joseph A. Borgen, Dean of Occupational and Technical Studies, assigned at 25% time.

5. 1 Co-Director: Dwight E. Davis, Curriculum Coordinator, assigned at 50% time.

6. Consultant Fees: The budget request of $5,250.00 for consultant fees is based on $75.00 per day for 70 consultant days. Consultant services will be sought for various aspects of model development and project evaluation.

7. Consultant Travel: Using the figure of $6.00 per day for food, $9.00 per day for lodging, and $70.00 per day for transportation gives a total of $85.00 per consultant day for travel. The total of $5,950.00 for this item was estimated on the basis of approximately 70 consultant days requiring travel to the project center. (Travel shall comply with State requirements of 9¢ a mile or travel via air coach rates.)

8. Staff Travel: Using the same base figure for travel as in item 7, the figure of $3,000 for staff travel was estimated.

9. Secretarial Materials and Printing: Estimating the cost of duplicating materials and the printing of descriptive materials, the figure of $1,500.00 was established.

10. Audio-Visual Services: The rental of audio-visual equipment for the video and/or audio taping of conferences and individual visits will be a necessary means of recalling data. The estimated cost based on equipment cost and rental is $3,000.00.

11. Resource Materials: The purchase of books, micro-film, micro-fiche, and the purchase or rental of other similar resource material will be necessary for data gathering. The cost was estimated by using the figure of 300 bits of information at an average cost of $5.00 per bit equalling $1,500.00.

12. Rental Office Space and Conference Rooms: Office space and conference space will have to be rented as it is not now available at Joliet Junior College. Such rental will cost an estimated $5,000.00 per year.

13. Telephone: Toll charges for long distance calls were calculated on the basis of the number of consultant days with Detroit, Michigan, as an average calling distance arriving at an estimated cost of $2,378.00.

PERSONNEL QUALIFICATIONS

Co-Director: **Joseph A. Borgen**

Position: **Dean of Occupational and Technical Studies**

Education: **Bachelor of Science Degree and Master of Science Degree,**
Stout State University
Menomonie, Wisconsin

Graduate Leadership Development Program for Vocational-Technical Education
University of Michigan
Ann Arbor, Michigan

Pertinent Professional Experience:

August 1964 - April 1966:	**Instructor in Technical Education** **Schoolcraft Community College** **Livonia, Michigan**
April 1966 - August 1968:	**Assistant Dean of Instruction** **Technical-Vocational** **Schoolcraft Community College** **Livonia, Michigan**
August 1968 - Present:	**Dean of Occupational and Technical Studies** **Joliet Junior College** **Joliet, Illinois**

Co-Director: Dwight E. Davis

Position: Curriculum Coordinator

Education: Bachelor of Science Degree
Stout State University
Menomonie, Wisconsin

Master of Arts Degree
Michigan State University
East Lansing, Michigan

Advanced Graduate Work toward Ph.D. at Michigan State University
(emphasis in curriculum and research)

Pertinent Professional Experience:

September 1964 - May 1965:	Research Assistant American Industry Project Stout State University (USOE Contract No. OE-5-85-060) Menomonie, Wisconsin
June 1965 - August 1966:	Assistant Curriculum Specialist American Industry Project Stout State University
September 1966 - June 1967:	Administrative Assistant Research and Development Program in Vocational-Technical Education Michigan State University East Lansing, Michigan
January 1967 - June 1969:	Secondary Teacher and Department Chairman in Industrial Education Lansing Public Schools Lansing, Michigan
July 28 - August 8, 1969:	Graduate Workshop Director Department of Secondary Education and Curriculum Michigan State University East Lansing, Michigan
July 1969 - Present:	Curriculum Coordinator Joliet Junior College Joliet, Illinois

Project Coordinator: (To be employed)

Education: Graduate level training in research and a knowledge of vocational-technical education.

Professional Experience: Preferably this individual would have demonstrated experience in directing a research effort, working with consultants on a group and individual basis, and general organizational ability

Research Coordinator: (To be employed)

Qualifications and experience for this individual are basically the same as for the project coordinator with more competency in research methodology and design.

APPENDIX B

PHASE I - BUDGET AND BUDGET DESCRIPTION

APPENDIX B

PHASE I - BUDGET

March 1, 1970 - June 30, 1970

ITEM NO.	PROJECT STAFF	STATE FUNDS	LOCAL FUNDS	TOTALS
1.	1 Co-Director (25% time)		1,668.00	
2.	1 Co-Director (50% time)		2,248.00	
3.	1 Project Coordinator (full-time)	6,000.00		
4.	1 Research Coordinator (full-time)	6,000.00		
5.	2 Secretaries (full-time)	1,800.00	1,800.00	
				19,516.00
	PROJECT SERVICES			
6.	30 consultant days outside of working conferences @ $75.00 per day	2,250.00		
				2,250.00
	TRAVEL			
7.	Consultant Travel	900.00		
8.	Staff Travel	3,000.00		
				3,900.00
	MATERIAL AND SUPPLIES			
9.	Secretarial Materials and Printing	1,500.00		
10.	Audio-Visual Services	1,000.00	500.00	
11.	Resource Materials	500.00	500.00	
				4,000.00
	OTHER			
12.	Overhead and Facilities	600.00	200.00	
13.	Telephone	1,000.00		
				1,800.00
	TOTALS:	$24,550.00	$6,916.00	$31,466.00

PHASE I - BUDGET DESCRIPTION

Item No.

1. 1 Co-Director: Joseph A. Borgen, Dean of Occupational and Technical Studies, assigned at 25% time.

2. 1 Co-Director: Dwight E. Davis, Curriculum Coordinator, assigned at 50% time.

3. 1 Project Coordinator: To be employed on a full-time basis.

4. 1 Research Coordinator: To be employed on a full-time basis.

5. 2 Secretaries: To be employed on a full-time basis.

6. Consultants: Consultants will be visited or brought to the campus to the extent of approximately 30 days @ $75.00 per day.

7. Consultant Travel: Using the figure of $6.00 per day for food, $14.00 per day for lodging, and $70.00 per day for transportation gives a total of $90.00 per consultant day for travel. The figure of $900 total for consultant travel was estimated on the basis that only about 10 consultants will be asked to visit the project center.

8. Staff Travel: Using the same base figure for travel as in item #8, the figure of $3,000 for staff travel was estimated, since it will be necessary for staff to visit most consultants to study their activities relevant to this project.

9. Secretarial Materials and Printing: Estimating the cost of duplicating materials and printing of descriptive materials, the figure of $1,500 was established.

10. Audio-Visual Services: The purchase and rental of audio-visual equipment for the video and/or audio taping of conferences and individual visits will be a necessary means of recalling data. The estimated cost based on equipment cost and rental is $1,500.

11. Resource Material: The purchase of books, micro-films, and the rental of other similar resource materials will be necessary for data gathering and as resource materials for in-service training programs. The cost was estimated by using the figure of 200 bits of information at an average cost of $5.00 per bit, equalling $1,000.

12. Overhead and Facilities: Office space and conference space will have to be rented as it is not now available at Joliet Junior College. This will result in an estimated cost of $200 per month.

13. Telephone: Toll charges for long distance telephone calls was calculated on the basis of 30 consultant days with the anticipated telephone time over four months, running approximately 90 minutes per consultant day. Using Detroit as an average calling distance, the cost would be 90¢ for the first three minutes and 25¢ for each additional minute, resulting in a cost of $22.65 per consultant day. Based on this information, the amount of $1,000 is estimated for telephone costs.

APPENDIX C

PHASE I - TASK LIST AND TASK COMPLETION SCHEDULE

GUIDELINES FOR TASK REPORTS

PHASE I - Research and Development Project
In Occupational Education
Joliet Junior College

Scheduling:

All task reports due no later than date specified on task completion network.

Interim reports for each task due 1/3 through the task:

decision - revise
continue
terminate

This report may be written or oral at the discretion of the Task Coordinator to whom the report is made.

If the decision is to revise, a second interim report is due 2/3 through the task:

decision - revise
continue
terminate

Final Report Format

Typed, double spaced
One page (maximum) abstract
Copy of task description with revisions and dates of the revisions
APA (American Psychological Association) format

Final Report Style

Style should stem from the function of the report--which is to explain and clarify, thus we would expect the style to be more nearly that of a newspaper article than that of a scholarly journal. The report should be as short as possible.

TASK LIST
PHASE I
RESEARCH AND DEVELOPMENT PROJECT
IN OCCUPATIONAL EDUCATION
JOLIET JUNIOR COLLEGE

Task 1 To prepare a preliminary report which will serve as a dissemination plan for the remainder of Phase I through Phase II.

This report should account for audiences to be reached, the type of dissemination to be used, costs required for production, copy and distribution, and time required for production, copy and distribution.

April 13 - April 20

Task 2 To prepare a preliminary report on two or more alternative plans for resource acquisition, handling, storage and retrieval.

Cost and time estimates should be included for each phase of the project. Each phase component should include a closure alternative that shows how the plan can be terminated with maximum benefit if funding is not available for an additional phase.

April 13 - April 20

Task 3 To provide a report consisting of a plan and preliminary cost estimates for outside evaluation task through Phase II.

This task should spell out the nature of the evaluation system and final report, evaluation services which will be provided and services which must be provided by the project to the outside evaluating agency.

April 13 - April 20

Task 4 To prepare a preliminary management strategy report for the preliminary proposal.

This report should include some form of PERT network or its analog, tasks to be accomplished during Phase II, time and cost estimates, staff and support requirements and facilities needed.

April 20 - April 23

Task 5 To prepare a preliminary report which identifies resource agencies which can provide information for Phase I task completion.

Researchers are asked to provide communication among themselves of resources which they find that seem appropriate for other tasks. A copy of that communication will be sent to the person responsible for compiling the report on resource agencies.

This report should include the name of the agency, location of the agency, accession procedures, sub-element within the agency where information is located, and names of people and their phone numbers, if this is appropriate for accession of task or tasks for which this agency seems most appropriate.

Agency should be referenced by:

1. Name - Alphabetically
2. Task - Alphabetically
3. Project Phase - Numerically

(NOTE: This task is related to Task 12)

Task 6 To prepare a preliminary proposal for the implementation of Phase II.

A format for this report should be in accordance with that required by the Illinois State Board of Vocational Education and Rehabilitation, Division of Vocational-Technical Education.

April 23 - April 30

Task 7 To prepare a preliminary report which identifies potential consultants for Phase I.

The identification of persons should include the following:

1. The phase or task for which they seem most appropriate
2. Their name
3. Association with which they are identified
4. Phone number
5. Relevant experience and publications
6. Explanation of why this person seems to be an appropriate consultant for this particular task or phase

The report shall include a reference file in which consultants are referenced by:

1. Name - alphabetically
2. Organization they are attached to - alphabetically
3. Tasks which they seem most appropriate for
4. Phase in which they seem most appropriate
5. Estimate of cost for consulting time
6. How does this person work best as indicated by him or others, i.e., individually, in groups, at his office, etc.
7. Recommended by whom
8. Availability

April 13- April 30

(NOTE: This task is related to Task 13)

Task 8 To prepare a report on alternate approaches of curriculum design which are <u>not process models</u>.

Each model should be presented first as a separate entity. One part of the report should contrast all models which are presented in the report. Graphic illustrations should be provided, as well as a verbal description, if this seems appropriate. The reporter should not argue for or against any given design, but should present the data in as objective a manner as possible. The reporter is requested to include abstracts of critiques prepared by others related to the models presented.

April 13 - June 9

Task 9 To develop a report which identifies the relationship between a planned curriculum and the social and economic growth of a nation.

In particular the report should show the relationship between the following components:

1. Expansion and recession of occupations within the labor force and GNP
2. Breadth or specialization of preparation and GNP
3. Demand for proportion of a given occupational type-- proportion of the type and recession of demand
4. The changing relationship between population level of education, GNP, nature of the labor force, and types of education

April 13 - June 9

Task 10 To prepare a report which will identify two to four different appropriate styles and formats for the position paper identified in Task 14.

Each format should be represented by a short sample; the advantages and disadvantages of each format should be presented; for each sample position paper the various elements should be identified along with their respective functions.

April 13 - June 9

Task 11 To report on two or more alternate process models which may be used for curriculum design.

The description of these alternate process models shall be described in parallel forms. The advantages and disadvantages should be contrasted explicitly. The reporter is requested to submit abstracts of published critiques of others prepared relative to the process models reported on.

Task 12 To prepare a final report on resource agencies which can provide information for subsequent tasks.

Researchers will provide communication among themselves of resources they find that seem appropriate to other tasks. A copy of that communication must be sent to the person working on this particular task. This report should include the name of the agency, location of the agency, accession procedures, sub-element within the agency where information is located; if appropriate, names of people and their phone numbers if this is appropriate for accession, the task and tasks for which this agency seems most appropriate. Agencies should be referenced by:

1. Name - alphabetically
2. Task - alphabetically
3. Phase - numerically

April 30 - June 16

Task 13 To prepare a final report which identifies persons who seem to be appropriate consultants for the completion of subsequent tasks.

The identification of persons should include the following:

1. Phase or task for which they seem most appropriate
2. Name
3. Association with which they are identified
4. Phone number
5. Relevant experience, publications, etc.
6. Explanation of why this person seems to be an appropriate consultant for this particular task or phase

The report should include a reference file in which consultants are referenced by:

1. Name - alphabetically
2. Organization they are attached to - alphabetically
3. Tasks which they seem most appropriate for
4. Phase which they seem most appropriate for
5. Estimate of cost for consulting time
6. How does this person work best as indicated by him or others, i.e., individually, in groups, at his office, etc.
7. Recommended by whom
8. Availability

April 30 - June 16

Task 14 To prepare a position paper delineating the applicability of process models to curriculum development and evaluation.

The position paper should represent the distillation of the reports preceeding it. It should provide the foundation and direction upon which further development in Phase II will be carried out.

June 9 - June 16

Task 15 To prepare a management strategy final report for Phase II.

This report should include some form of PERT network or its analog, tasks to be accomplished, time and cost estimates, staff and support requirements and facilities needed for the execution of Phase II.

April 30 - June 19

Task 16 To prepare a final report which provides a plan for outside evaluation of the project for Phase II.

This report should include cost, nature of the evaluation system and final report evaluation services to be provided by the project and services which must be provided to the evaluating agency.

April 30 - June 19

Task 17 To prepare a final report which will provide a dissemination plan for the project through Phase II.

This report should identify audiences, cost required for production, copy, distribution, time required for production, copy and distribution. This report should provide both an overall publicity program, as well as one which will provide possible programs for each phase if they seem appropriate. Phase components should include a closure alternative that shows how the plan can be terminated with maximum benefit if funding is not available.

April 30 - June 19

Task 18 To prepare a final proposal for Phase II.

This will be a proposal to the Illinois State Board of Vocational Education and Rehabilitation, Division of Vocational-Technical Education, including (1) the scope of the project, (2) rationale resulting from position paper and completion of Task 20, (3) objectives to be met in Phase II, (4) procedures for implementation, and (5) the budget and any other appendices related.

June 22 - June 25

Task 19 To prepare a final report for Phase I.

This will be a final report to the State Board of Vocational Education and Rehabilitation, Division of Vocational-Technical Education, including (1) review of the problem, (2) report on investigative activities initiated and completed in Phase I, (3) statement of project potential, and (4) appendices including (a) position paper, (b) task report, (c) Phase II proposal, (d) Phase I pert, (e) Phase II pert, and (f) materials disseminated.

June 25 - June 30

Task 20 To prepare a report on two alternative designs for gathering data on existing methods of program identification--development, execution, and evaluation in selected institutions offering technical and occupational programs.

Each design should provide for the identification of specific institutional policies, procedures, and practices relative to program development including the respondents, opinions, and judgements about the adequacy of the procedures they follow. Particular attention should be given in the design to meaningful involvement of key state and local leadership personnel in occupational and technical education.

This report should also include specifications as to the staff, cost, time required, and procedures for utilizing each design. The term "alternative" as used here is meant to suggest the differences in the complexity of the design for gathering data relative to this task description.

Due to the time factor involved, it may be necessary to pilot one of the alternative instruments in Phase I with a more complete sample being gathered in Phase II of the project.

April 13 - June 16

APPENDIX D

DESCRIPTION OF TENTATIVE MODEL FOR CURRICULUM DEVELOPMENT AND EVALUATION

DESCRIPTION OF THE TENTATIVE MODEL

FOR CURRICULUM DEVELOPMENT AND EVALUATION

The following constitutes a description of the tentative model (3) for program development and evaluation. Contained within the model are five sub-models dealing with program identification, program development, program implementation, program execution, and program evaluation. This description is intended to be used as an aid in understanding the graphic description of the model.

SUB-MODEL FOR PROGRAM IDENTIFICATION

Compilation of Needs

Statements of need for possible programming eminate from various organized and unorganized groups within the community the college serves. Such statements come in the form of expressed concerns for a specific educational program, as well as stated concerns with regard to problems that may in turn have implications for programming, i.e., needs of student clientele, employment shortages, lack of sufficiently trained personnel, etc. Resources that the college may look to within the community in the interest of compiling needs include business and industry groups, labor unions, educators, representatives of such organizations as the employment service, national lines of business, other associations representing various professional and nonprofessional groups, influential parties and political leaders, potential and existing students and the general populous.

Credibility Test

All input obtained from community resources in the compilation of needs must be tested or analyzed in view of the following evaluative criteria to assess the credibility of each. Of first importance is the number of sources expressing the need, mobility factors, nature of the technology or area of occupational or

technical training, and an empirical check on the need. Resources the college may draw on in performing the activity of the credibility test, include further discussion with the sources of the stated need, internal expertise, advisory groups, and other consultants. Having completed the credibility test the curriculum planner should be in a position to determine whether to proceed with further development in terms of defining the need; or if insufficient information is available to establish the credibility, it may become necessary to recycle to the compilation of needs and in turn the source of need for further information and substantiation.

Needs Definition

After expressed needs have been processed through the credibility test, it is necessary to determine program implications of the stated needs on the basis of a careful analysis of each. Resources that can be brought to bear in carrying out this activity include internal expertise, advisory committee groups and consultants. In further defining the need, it is important that one consider evaluative criteria such as the degree of agreement between various organizations or individuals expressing similar needs and the specificity of their response as it relates to training, or a description of desired performance capabilities.

After completing the definition of the need, the curriculum planner again is in the position of going ahead to the identification of the possible program, or in the event that insufficient information is available, it may be an indication that one must recycle to the point of again assessing the credibility of the need, or in turn returning to the source of the need for further information.

Identification of Possible Programs

Assuming that the curriculum planner is able to define the need in terms that give rise to a possible program for the college or educational institution, it is then possible to develop a tentative proposal for a program area giving

particular attention to the inputs in terms of students and resources, and the outputs in terms of training capability. Resources the curriculum planner may draw on include internal resources, consultants, other college programs, and the sources of need.

In developing this tentative program proposal, the curriculum planner must be constantly aware of the need for a complete and accurate specification of the product entering and the product leaving the training program.

Having completed the identification of a possible program and the development of a program proposal, the curriculum planner is in the position of moving ahead to the feasibility test; or in the event that adequate information is not available to carry out the development of a possible program, it may be necessary to recycle to the point of further defining the need, or in turn reverting back to previous steps within the model.

Feasibility Test

A prepared program proposal must now be subjected to a series of feasibility questions that are important in giving direction to the curriculum planner regarding further development of the program. The feasibility questions that will serve as evaluative criteria are as follows:

A. Is the given program compatible with the college philosophy? Does the program foster the development of comprehensive, occupational and technical offerings? The spectrum of program offerings at the Educational Agency should be consistent with the spectrum of manpower demands in the local, regional, and state labor markets.

B. Does the Educational Agency have available or can they obtain financial resources, classrooms, laboratories and equipment to carry out this program? Lack of these elements would probably impair the establishment and execution of a given program.

C. Is there a legitimate need for trained manpower in this occupation now and in the immediate future? This need should be documented in terms of the local district, regional area, and the State of Illinois.

D. What are other schools in the local district, the region, or the State of Illinois doing to supply employable people for satisfying this given need? If the need for manpower is being adequately satisfied by some other agency, the educational agency should not duplicate these efforts and produce an oversupply of trained manpower.

E. Would the given industrial organization, labor organization, or other similar organizations lend their support to this new program? The educational agency cannot operate an effective occupational program without the support and cooperation of the business, industry, or labor organization for which the people are trained.

F. Is it possible for the educational agency to employ a qualified instructional staff for execution of the instructional program? Is it possible for the junior college to be financially competitive with the related business or industry in attracting qualified personnel? For some highly specialized programs employment of qualified instructional personnel may be impossible.

G. Is there a student interest in the local district for this type of program, or can it be generated?

H. After completion of this program, could a graduate be placed in a position of adequate renumeration? The educational agency may not justify an educational program to prepare people for extremely low paying positions.

Some of the resources the curriculum planner can draw upon in looking at these feasibility questions include the local administration, the local board, consultants, faculty, expressed sources of the need and existing in potential students.

Having subjected the possible program to these feasibility questions, the curriculum planner is now in the position of having successfully identified a program for further curriculum development, or in the event that adequate information was not available, to measure satisfactorily the feasibility questions. It may be necessary to recycle to previous steps within the program identification model. In the event that the program is judged as being acceptable and one having priority for further program development, it may also be held for a period of time because of certain variables such as the lack of facilities or finances.

SUB-MODEL FOR PROGRAM DEVELOPMENT

Having now successfully identified a program for development, it is necessary for the curriculum planner to move into a systematic process for the development of an educational program.

Definition of Clientele and Content

Beginning the development of any identified area of programming necessitates further definition of the clientele for the educational program with specification as to the types of individuals--intelligence, characteristics, aptitudes, or other such definitive characteristics that may be of assistance in aiding the program to meet specific training needs. In addition, it is important that a clear definition of the content for the program be formulated. In both of these activities, resources can be utilized to the extent of consultants, faculty, advisory committees, and other research data.

Identification of General to Specific Objectives

Assuming a clear definition of the clientele in terms of unique characteristics and a definition of content in terms of a task analysis, the curriculum planner should now be in a position to identify objectives on a continum from general to specific.

Selection of Program Objectives

The selection of program objectives should be made from the listing of general to specific objectives as they apply to the clientele and teaching situation.

Having completed the writing of specific objectives the curriculum planner is in the position to begin the development of the tentative curriculum format, or in the event that insufficient information is available to develop specific objectives. It may be necessary to recycle to the previous steps within the program identification process or early steps, or the program development process.

The Development of a Tentative Curriculum Format

The development of a tentative curriculum format involves the description of total credits necessary for completion of the program, the duration of the program, and general requirements of the program.

Course Identification

Having developed a tentative curriculum format, it is now necessary for the curriculum planner to identify specific courses as a result of the grouping of specific objectives, and to fit each course into the curriculum format.

Development of Specific Course Objectives

Having identified individual courses as they relate to specific program objectives and general program objectives, the curriculum planner is now in a position to develop specific course objectives in an effort to show their relationship to program objectives. Resources should be brought to bear in the development of these objectives in terms of possible consultants, faculty, and advisory committees.

Identification of Instructional Staff Competencies Needed

Having completed the identification of instructional objectives and a complete definition of the clientele and content, it is now possible to identify the types of instructional staff competencies needed for the best possible match of instructor to course.

Having completed the identification of instructional staff competencies needed, the curriculum planner is now in a position of having completed the development of a program, and in a position to move on to finalizing the curriculum format; or in the event that insufficient information is available, to develop sufficient course objectives, it may become necessary to recycle to the point of course identification or previous steps within the developmental process.

SUB-MODEL FOR PROGRAM IMPLEMENTATION

Finalize Curriculum Format

Having completed the developmental process for a program, the curriculum planner is now in a position to finalize the curriculum format in terms of

specific courses, credits allotted for each course, time spent in lab and lecture, and other similar type of considerations. Having completed the finalization of the curriculum format, the curriculum planner is in the position to move on to further implementation of the program, or in the event that inadequate information is available for certain aspects of the development of the format, it may be necessary to recycle to the point of course identification or other previous steps within the developmental process.

Securing Instructional Staff, Development of Instructional Facility, Initiate Student Recruitment

Having finalized the curriculum format, the concern of the curriculum planner must now be that of securing instructional staff, the ordering of necessary equipment and materials for instruction, and the development of instructional materials as well as initiating a coordinated plan for student recruitment in cooperation with other members of the college staff. Another aspect of concern here must be the updating of student advisers and counselors with regard to the new program to be offered. These activities should occur somewhat concurrently.

Further Development of Courses and Instructional Materials

Having initiated the previous activities, it now becomes possible to work with instructional staff, if available, on the development of each individual course within the curriculum in more specific form with regard to units of instruction and instructional materials. Having completed this step, the development process is now at the point of having a program ready for execution.

SUB-MODEL FOR PROGRAM EXECUTION

Program execution is the initial act of starting the course upon successful completion of all previous activities as a necessary input to insure successful program execution.

SUB-MODEL FOR PROGRAM EVALUATION

Evaluation of Student Achievement with regard to Specific Course Objectives

An important input in the evaluation process is the comparison of student achievement with specific course objectives as a measure to provide information relative to student success in learning tasks prescribed for performance within a certain occupation.

Compare Student Success On The Job with Program Objectives

The data gathered through follow-up studies regarding the student success on the job in comparison to stated program objectives is another important input in looking at the success of the program from the standpoint of the consumer.

The process model described from the initial point of opening communication community resources through the point of execution facilitates an ongoing evaluation if the curriculum planner continues to measure already developed programs against data gathered in all steps of the developmental process.

In view of this, it is recommended that the curriculum planner at this point again recycle to the point of looking at stated needs and move on through the developmental process to the point of program implementation in an effort to uncover new information that might be important in the revision of the program now established.

Data gathered in this process should enable the curriculum planner to make decisions relative to continued course offerings, scheduling, types of students, performance requirements from the consumer point of view, and other such concerns important in determining whether a program will move on, be terminated, or revised.

ACKNOWLEDGEMENT

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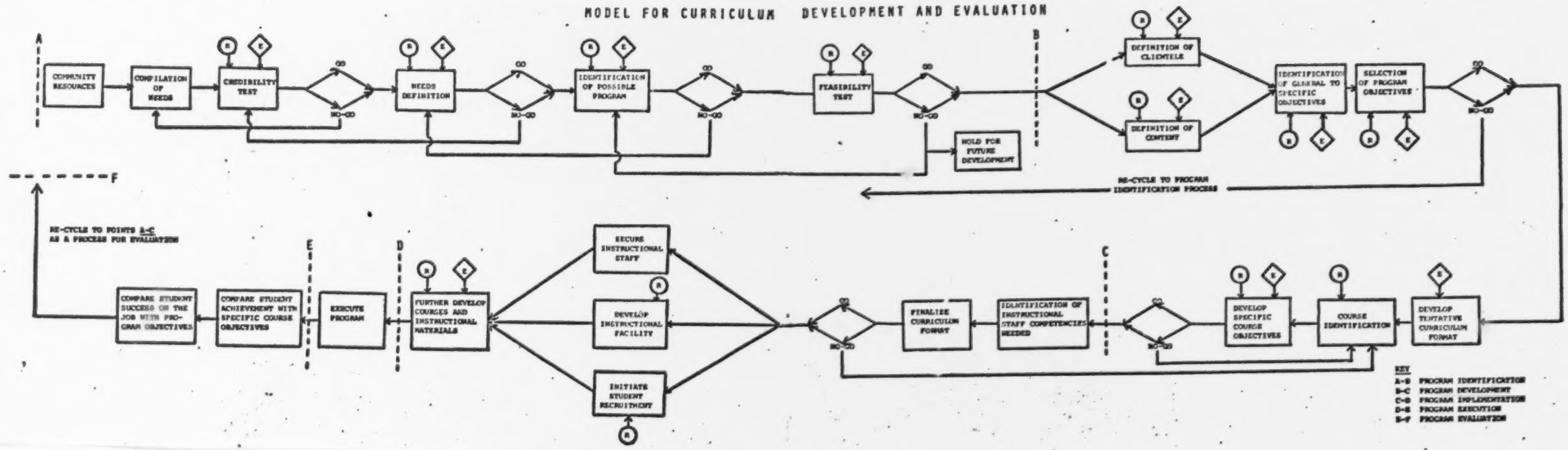
MODEL FOR CURRICULUM DEVELOPMENT AND EVALUATION



A P P E N D I X I I

CONSULTANTS AND AGENCIES IDENTIFIED DURING PHASE I

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Consultant	Model Development	Decision-making Theory	Community Needs	Curriculum Development	Curriculum Implementation	Curriculum Execution	Other
Allen, Richard G.			x	x			
Arnold, Joseph P.			x	x	x		
Arnold, Walter M.	x		x	x	x	x	x
Bangs, F. Kendrick			x	x			
Bolton, Earl C.	x	x	x	x	x	x	x
Boortz, Dr. Nathan H.				x	x		
Brandon, George L.			x	x	x		
Campbell, Gordon M.				x			
Cohen, Bernard			x	x			
Brownback, T. W.							
Crawford, Lucy C.	x			x	x	x	
Dobrovolny, Jerry S.			x	x	x	x	
Donaho, John A.		x	x	x			
Doss, Harriet M.				x	x	x	
Eash, Maurice J.	x						x
Ellis, Joseph R.	x						x
Enos, Francis A.			x		x		
Evans, Rupert W.							x

Consultant	Model Development	Decision-making Theory	Community Needs	Curriculum Development	Curriculum Implementation	Curriculum Execution	Other
Gagne, Robert M.							x
Grotelueschen, Arden D.							x
Hoke, Gordon A.	x	x	x	x	x	x	x
Homquist, Henry E.			x				
House, Ernest R.							x
Ingle, Robert B.			x				
Jackson, David M.				x	x		x
Karp William			x	x		x	x
Coleman, Langston L.			x	x	x	x	
Larks, Barnett			x				
Larson, Dr. Milton E.			x	x	x	x	x
Lisack, J. P.			x				
Mayo, Dr. Selz C.	x	x	x			x	x
Millman, Jason		x		x			x
O'Banion, Terry	x			x			
Rehkopf, Frederick A.			x				
Rothbaum, Melvin							
Schaefer, Carl J.				x		x	

Consultant	Model Development	Decision-making Theory	Community Needs	Curriculum Development	Curriculum Implementation	Curriculum Execution	Other
Schill, Willim J.			x	x			
Shackelford, Earl L.		x	x				
Shuinberg, Benjamin							
Slocum, Robert L.							
Sjogren, Douglas	x						x
Smith, Harold G.	x	x	x				x
Somers, Gerald G.	x		x				
Stake, Robert E.							x
Steele, Joe M.				x			x
Stern, Jacob	x			x			
Stromsdorfer, Ernst W.	x	x	x				
Tiemann, P. W.							x
Tuckman, Bruce W.	x			x			
Ullery, William J.	x		x	x	x	x	x
Uhlig, George E.	x		x				x
Walberg, Herbert J.	x						x
Wallace, Wimburn L.							x
Warmbrod, Robert, J.			x	x	x	x	x
Wickham, Woodward A.	x		x	x	x	x	

Agency	Model Development	Decision-making Theory	Community Needs	Curriculum Development	Curriculum Implementation	Curriculum Execution	Other
ABT Associates	x	x					x
Anathon, Inc.	x	x					
ASCD				x	x	x	
Battelle Memorial Inst.			x				x
Becker & Becker Associates, Inc.			x				x
B'nai B'rith Vocational Service			x				
The Brookings Institution							x
Bureau of Occupational Education Research	x						x
Bureau of Employment Security							x
Burks County Technical School				x			x
T. A. Budne & Associates, Inc.	x	x					x
Cadres Professionals, Inc.	x	x					x
Center for Behavior Modification							x

Agency	Model Development	Decision-making Theory	Community Needs	Curriculum Development	Curriculum Implementation	Curriculum Execution	Other
The Center for Vocational-Technical Education	x	x	x	x	x		x
Dunlap and Associates							x
B. M. Dornblutt and Associates, Inc.							x
Educational Facilities Laboratories							x
Foothill College				x			x
Greenleigh Associates, Inc.			x				x
National Planning Association							x
Office of Manpower Policy, Evaluation, and Research							x
Sanford R. Goodkin Research Corporation			x				x
Stanford Research Institute			x				x

A P P E N D I X I I I

PERSONNEL QUALIFICATIONS

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Research Coordinator: Urban T. Oen

Education: Bachelor of Science Degree and Master of Science Degree
The Ohio State University
Columbus, Ohio

Doctor of Philosophy Degree
Michigan State University
East Lansing, Michigan

Program Emphasis: Agricultural and Vocational Education; Administration and Higher Education; Educational Media; and Research, Evaluation, and Educational Statistics

Pertinent Professional Experience:

July, 1963 - July, 1965:	Vocational Agriculture Instructor New Riegel High School New Riegel, Ohio
January, 1966 - July, 1966:	Research Assistant National Center for Vocational-Technical Education The Ohio State University Columbus, Ohio
September, 1966 - July, 1969:	Assistant Instructor, Research Assistant, and Assistant Project Director R & D Projects Voeational-Technical Education Michigan State University East Lansing, Michigan
October, 1969 - September, 1970:	Higher Education Consultant Michigan Department of Education Lansing, Michigan

Project Coordinator: David A. Anderson

Education: Bachelor of Science Degree and Master of Science Degree
Oklahoma State University
Stillwater, Oklahoma

Doctor of Education Degree
Oklahoma State University
Stillwater, Oklahoma

Program Emphasis: Electronics; Industrial Education; Technical Education; Manpower; Higher Education

Pertinent Professional Experience:

May, 1955 - January, 1959:	Electronics Instructor U. S. Air Force, L. A. F. B. Denver, Colorado
December, 1961 - August, 1965:	Electronics Instructor Technical Institute of Alamance Burlington, North Carolina
September, 1965 - August, 1968:	Engineering Aid, Technician Electronics Research Laboratory Oklahoma State University Stillwater, Oklahoma
September, 1967 - May, 1968:	Research Intern with Dr. Maurice W. Roney and Dr. Paul V. Braden on research study entitled: "Occupational Education Beyond the High School in Oklahoma"
September, 1968 - July, 1970:	Graduate Research Assistant Research Coordinating Unit State Department of Vocational-Technical Education Stillwater, Oklahoma Also at this time - Wrote course material and taught a course for the Electro-Mechanical Technology Program Under Development Oklahoma State University Stillwater, Oklahoma